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- Creating unreal art
- Electronic books
- And all the regulars and reviews

AUGUST 1994 Vol.12 No.6 £2.95 Hfl 14.50

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PUBLICATIONS



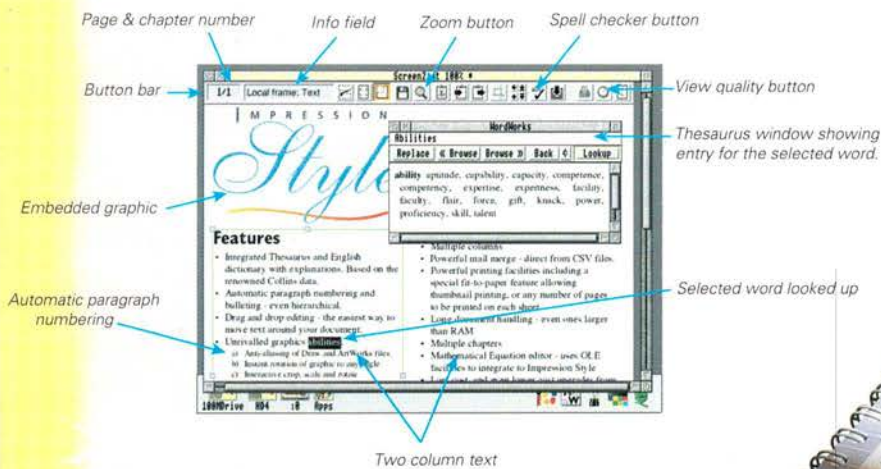
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Plus PC • Archimedes • A200 series • A400 series • A3000 series • A4000 • A5000

IMPRESSION Style

Impression Style is the newest word processor member of the Impression family, and the most comprehensive and powerful version so far released. Over the last few years Impression has become the most successful 32-bit Acorn software application and while Impression's DTP capabilities have been renowned, the fact is that most users use it as their day to day word processor. Impression Style is a major update, with special attention paid towards improving the word processing abilities still further, and making it even easier to use than before. So, for example, it now includes automatic paragraph numbering and

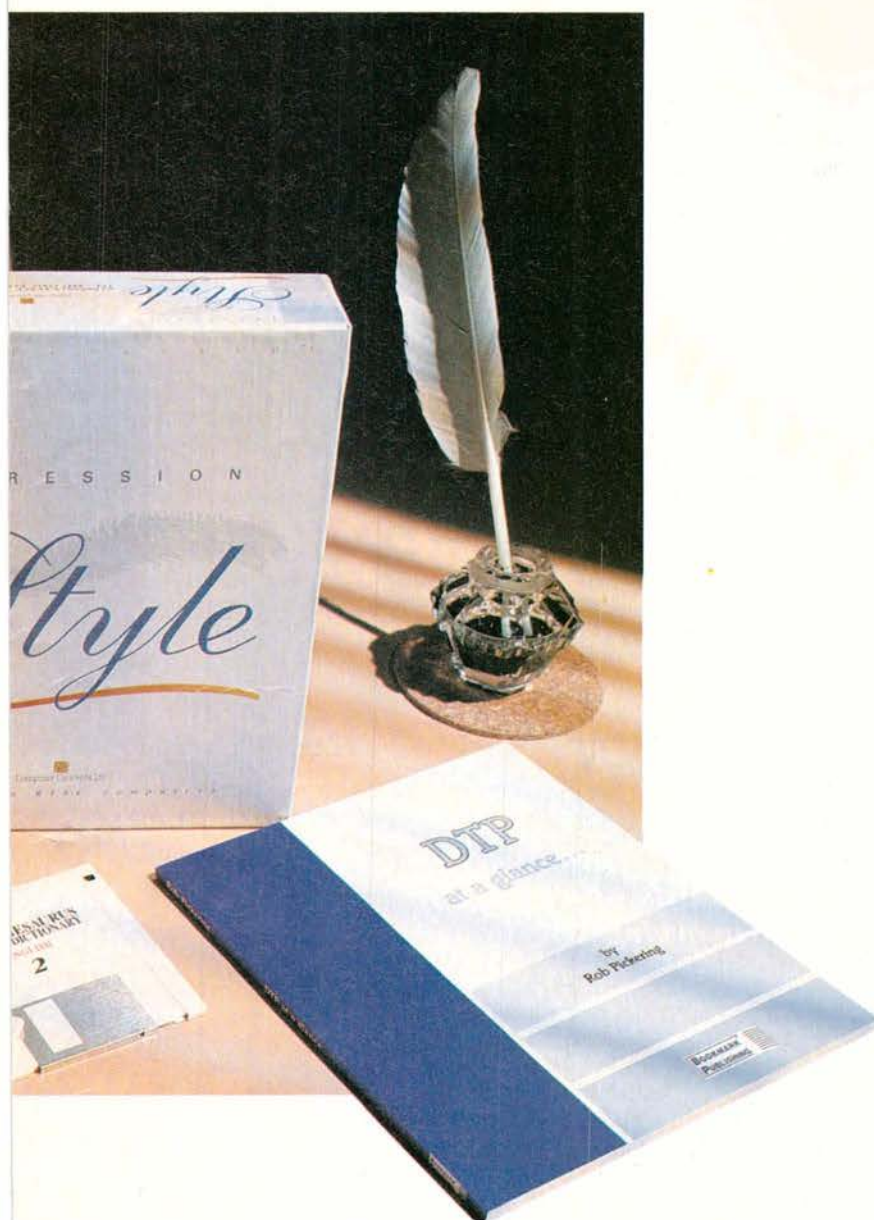


two sorts of on-line help amongst dozens of other improvements.

For those with technical writing needs it includes a mathematical equation editing utility and table building utility. For writers it includes what Archimedes World called "the superb WordWorks dictionary and thesaurus package." Other features that help make Impression Style a better text processor include automatic abbreviation expansion - one of the greatest time saving features available, drag and drop editing, an optional, configurable tool bar, along with firm favourites such as spell check as you type.



In a *modern* world of computer software we have *created* a package to leave you with a lasting *impression*



Archimedes World summed it up by calling it "a document processor of immeasurable power and sophistication."

And for those who need complete control over the page layout and appearance, Archimedes World and Acorn User magazines both had exactly the same conclusions - "Style itself is currently the best DTP package available."

"Importing foreign formats is one thing Style handles better than any other package I have encountered."

"The manuals are brilliant and offer full details on the use of the software. In fact, these manuals are so good, it seems unlikely that there will be much need for supplemental books from third party publishers."

"At the end of the day, Impression Style is a superb product for the relatively small asking price."

Archimedes World, Feb 1994

"Impression Style represents ridiculous value for money."

Acorn User, Jan 1994

"There is no other product on the Acorn platform to touch this, whether at the £100 asking price point or at £500. Every writer should own a copy."

Archimedes World, Feb 1994

If you use your computer for word processing, then shouldn't you make sure that you use the best tools available?

Impression Style upgrade options

Upgrade from	Cost (ex VAT)	Total cost inc p&p and VAT
Impression Junior	£29 + VAT	£37.60
Impression II	£29 + VAT	£37.60
Other word processors †	£70 + VAT	£82.25

† Other word processors include: Pipedream, Wordz, Ovation, First Word Plus, TechWriter, EasiWriter, StartWrite and Acorn Advance. To upgrade simply return your key / master / N1 disc with payment to Computer Concepts.

Impression Style RRP £99 + VAT (£116.32 inc)

Refer to table for special upgrade offers.

2Mbytes RAM recommended

Low cost educational site licences available.

Full specification available on request.



Computer Concepts Ltd

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TEL: 0442 63933 FAX: 0442 231632
EMAIL: Info@CConcepts.co.uk.

Squirrel 2 – the relational database

We believe this to be the finest database available for the RISC OS platform, and a match for many more expensive products on the PC and MAC.

Squirrel offers unprecedented ease of use, yet has awesome power. Tables can be created in minutes by novice users, whilst those experienced in its use never cease to be amazed by its depth of functionality.

Squirrel Single User	£ 139.00
Squirrel Multi User	£ 556.00
Squirrel 'C' Developers Toolkit	£ 99.00



Netgain – high speed application loader

Netgain is a real breakthrough in Econet technology which reduces the frustration of slow load times for applications.

With Netgain, applications installed on the network server are available to any Netgain configured client, who can load them at hard disk speed simply by clicking on the icon. Compatible with Level 4 fileserver software.



Server Pack, including 10 user packs £ 200.00

Additional 10 User Packs £ 100.00

Waiter – The RISC OS menu system

Waiter is a complete menu-building system for RISC OS. Powerful, easy to use, hierarchical menus may be created, complete with icons and descriptions, enabling novice users to locate, run and move between programs. Passwords can be attached to applications or entire menus. The system is ideally suited for use with hard disks or networks.



Waiter Single User £ 35.00

Waiter Site/Network Licence £ 139.00

Server Pack, including 10 user packs £ 200.00

Additional 10 User Packs £ 100.00

Netgain for Ethernet – high speed application loader

Netgain for Ethernet provides the fastest transfer rates of any network currently available on the RISC OS platform. Typical transfer rate from a standard Ethernet system is approximately 200K/sec but Netgain achieves up to 900K/sec. In addition to this transport throughput increase, intelligent caching and a general reduction in bottlenecks result in staggering reductions in load times for typical applications. No more than 64k of RAM is taken from any workstation.



Ethernet Cards – for high speed networking

Digital Services ethernet cards have been designed to provide maximum possible bandwidth on Acorn networks. Both thin ethernet (10 Base 2) and twisted pair (10 Base T) cards are available. The cards incorporate two unique features: the computer's CMOS RAM may be password protected, thus preventing unauthorised personnel from tampering with the configuration, and secondly the Netgain for Ethernet client software is included in the ROM.

Mini expansion card for A3000/3020/4000	£139.00
16 bit expansion card for A300/400/540/5000	£139.00

Digistore

Digistore – tape streamer

Digistore is fast, flexible and TOTALLY reliable in operation. Friendly RISC OS software allows selective backup and restore. Backup commands may be included in your own programs.

Digistore can be connected to any RISC OS computer via a SCSI interface, and uses industry standard 1/4" tape cartridges.

250Mb £799.00

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1Gb £999.00

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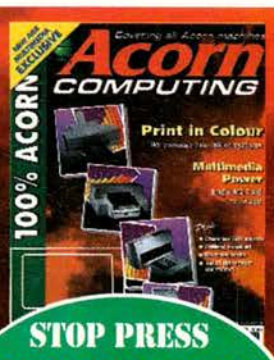
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Do you want to get your hardcopy in colour? Read our special feature on colour printers to find out just what colour printers you can buy and what they can achieve.

Starting on Page 22



**STOP PRESS
ACORN'S BILLIONS?**

Read about Acorn's new interactive multimedia deal with multi-billion pound potential in Newsbeat on page 16

REGULARS

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What will the digital superhighway mean to you? Steve Turnbull examines the implications of new technology.

News 16

All the latest news of products and events taking place in the fast changing world of the Acorn computer.

Problem Solved 38

Our technical editor opens his mail and shares the secrets behind some of those tricky hardware problems.

TechForum 58

Are you an expert programmer? Our hints and tips series is just for you with ideas and algorithms to help you work.

Graphics 60

It's a painting but is it art? Mike Goldberg becomes abstracted about little splashes of colour on his easel.

Public Domain 63

Teri Paul is back again with her pick of public domain and shareware programs to enhance your computer.

The Databay 66

Our electronic ear to the ground, Hal, brings you all the latest games gossip and news, plus cheats, hints and tips on your favourite games.

Body Building 75

A dripping tap can reveal amazing insights into Chaos theory, Mike Cook shows how you can explore it too.

Letters 80

This is your opportunity to voice your news, ideas and views on everything in the Acorn world from viruses to joysticks.

REVIEWS

Colour Printers 22

We round up four different types of ink-jet colour printer to see what you can achieve and how much it will cost.

Eagle M2 27

We explore the potentials of this incredible new expansion card that's packed with multimedia electronics.

Schema 2 50

It's finally here so how does this new version match up to existing software. We report on our findings.

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Check out what's in store for you this month on the best cover disk available for the Acorn 32-bit RISC OS range.

32-bit Subscribers 8

Our special extra subscriber's disk is jam packed full of goodies so find out what's on it this month.

BBC Disk 11

Full details on what's on the subscription disk for the 8-bit BBC Micro this month, and how to use it.

Learning to Print 42

We explain how to interface your program with the standard Acorn printer drivers to produce output on any printer.

Chaos and Little Animals 46

You can find out how to use a spreadsheet and simple equation to explore the principles of populations and Chaos.

Scrabble Competition 49

Your chance to win some great Scrabble prizes in this easy to enter contest.

Reader Offers 68

Your chance to buy some low cost copies of really useful software.

Short reviews 53

We check out a new selection of programs and utilities:

- MultiLink ● Z-Link II ● MacFS
- ImageFS ● Low cost CD-Rom drive

Four Slice 57

We take a look at the maximum sized expansion for the Risc PC, is it silly or a genuinely useful addition to the system?

Learning Curve 70

We survey the latest in educational software for the Acorn computers: ● Exploring Nature ● Sea Rescue ● Conjuguez ● Maths Card

THE MEGADISK

Britain's best Acorn cover disk contains hours of fun and a host of useful utilities linked to our editorial features to make the magazine come alive on your desktop.

Full details about the packed Megadisk – see page 6.



- **Playdays**
The highly successful pro-school children's program brought to your computer
- **First Words with Smudge**
A brand new early-learning experience with the help of a small dog
- **Flashback, the upgrade**
If you have RISC OS 2 this upgrade will let you explore Flashback successfully
- **Graphics with MAG**
Now you can become a great abstract artist without lifting a brush
- **Printer driving**
Three handy programs to show you how to print from programs
- **Public Domain**
Five great PD programs to delight you, some useful, some silly

Subscribe now! — See page 40

SUBSCRIBE to *Acorn Computing* and you'll get an amazing value-for-money deal that beats all our rivals: Not only do you get a whole years-worth of issues for LESS than any other Acorn magazine, you get TWO disks every month and a free gift.

See Page 40 for details of this unbelievable offer.

**GET YOUR NEWSAGENT TO RESERVE
YOUR COPY NOW – SEE PAGE 56
AVAILABLE AT W.H. SMITH AND
ALL GOOD NEWSAGENTS**

Most of the editorial and adverts in this magazine were produced with ArtWorks and Impression from Computer Concepts

The MegaDisk

What's on this month's disk?

- Playdays
- First Words with Smudge
- RISC OS 2 Flashback
- Public domain
- Programs from the magazine

Playdays: Why Bird know-how

ANYONE with small children – aged three to eight – will recognise the Why Bird, Mr Jolly and Peggy Patch as important characters in their child's life. This very popular Children's BBC TV program has been brought to the computer screen courtesy of SkillsWare (0243 574574).

Playdays has been designed to be easy enough for children to use themselves and contains 13 separate educational games using over 250 words and pictures which have been divided into groups based on the alphabet, and all but one has a difficulty level.

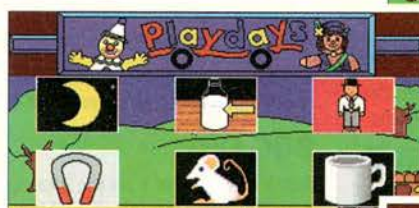
The Why Bird acts as tutor and friend and success is met by tunes and animations. After three unsuccessful tries the child is given the answer. At the end of a series of games a performance table is displayed so that you and your child can see their progress.

This month's MegaDisk contains one of the 13 games which you can play at four different difficulty levels – *Odd One Out*. You can play this as many times as you like using A E M R V Z from the alphabet.

Four words or pictures are displayed and the child selects the one they think is the odd one out. *Odd One Out* encourages reasoning and word recognition as well as mouse control. If you want to see the other games in the series a breakdown is available if you choose

the letter X from the alphabet choose box.

The complete version of Playdays costs £25.99 and comes with a set of teachers notes and ideas.



These words begin with M.

● M words...

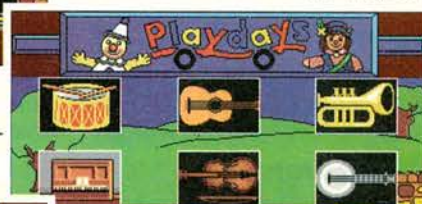


These things are round.

● ...and R concepts

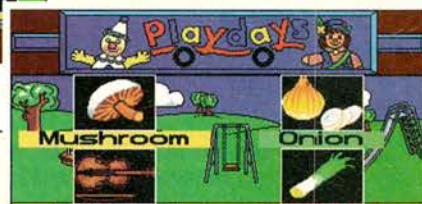


● Sign in with the Why Bird



These all play music.

● ...and M...



Which is the odd one out?

● Find the odd one out

Getting started with the MegaDisk

THE programs on this disk are stored in a highly compressed format which sometimes enables as much as 1.6Mb of programs and data to be stored on a 800k floppy disk.

The procedure for running the programs is very straightforward and does not require learning any special methods or techniques. Switch on

your Acorn micro, put the disk in the drive and click the drive icon.

Now double-click !ACmenu – there's a short pause while it scans the archive then it displays a window of the contents. You can treat this new window like any other one for viewing disk contents, and run programs and open directories by dou-

ble-clicking them.

Large programs must be unpacked by dragging them on to a separate disk before being run. Some may have an !Install program that will do it for you.

We recommend that you always read the !ReadMe files or access the help information via the Help button.

First Words with Smudge: Reading and writing skills

THE MegaDisk has a definite pre-school feel to it this month with a new title from Storm Software (0935 817699) – **First Words with Smudge**. Aimed at children from about four years of age, Smudge will encourage young children to develop early word skills.

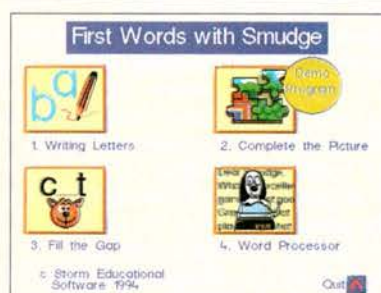
The complete program comes in four parts:

- **Writing letters:** Allowing children to trace around letters in different colours. In this version of the program you can trace around the letter *a* as many times as you like and change the colour by clicking the Adjust button on the mouse.
- **Fitting shapes:** Put shapes on to a background scene including I-Spy and Jigsaw options. The demo version comes with a number of jigsaws, but there is a time limit.

- **Practice your mouse control and letter tracing**



- **Fill the gap:** Select letters as well as the beginnings and endings of words – in this version a selection of A words.
- **Word processor:** Write your own letters and short stories – here limited to three lines.



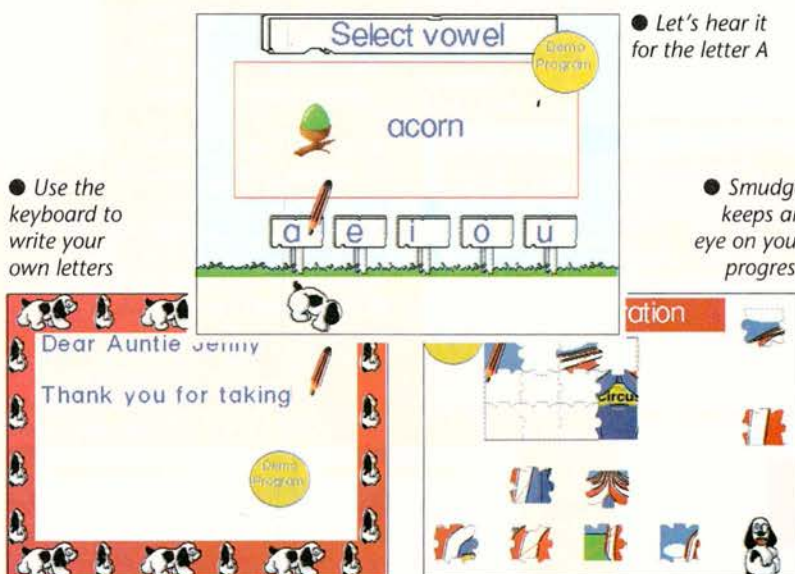
- **Four games to aid your reading and writing skills**

Smudge the spaniel will encourage you with somersaults and barks and is ideal for school or home use, encouraging reading and writing practice. This will not run on a Risc PC at present. The full version costs £25.99.

Flashback returns: RISC OS 2 at last

SOME people had problems running the US Gold Flashback demo from the June issue of Acorn Computing. Though the full program works on all RISC OS machines, a couple of errors crept into the demo version leading to problems on some machines.

If this applied to you the FlashUp directory on this month's MegaDisk contains the files you need to make it work. Simply de-archive the original Flashback demo on to a hard, floppy, or ram disk. Then just copy the !Flashdemo in the update directory over the top of the original demo and you're ready to go.



- **Use the keyboard to write your own letters**

- **Let's hear it for the letter A**

- **Smudge keeps an eye on your progress**

Public domain software: Freely useful

- **FontMsgs:** Faster font scans
- **Gremlin:** Just a little bit silly
- **PuddyTat:** A cat-friendly hourglass replacement
- **React:** A must for chemistry students
- **Tides:** Time and tides wait for no man – see where you stand

Programs from the magazine

This month why not try your hand at a variety of chaotic projects:

- **Body building:** Chaos and the dripping tap
- **32-bit graphics:** Art for art's sake
- **Databay:** BugHunter, Inertia, Quark, Robocod, Top Banana
- **Printer drivers:** Catch up with Ben Summers' article

FAULTY DISK?

If your cover disk or 32-bit subscription disk has a physical fault – doughnut won't rotate in the sleeve, disk errors and so on – please return it for replacement to:

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CF48 2YY

If there seems to be a fault with one of the programs please contact the magazine by post describing your machine set-up and exactly what happens when you run the program.

The 32-Bit Subscription Disk

What's on this month?

- Public Domain
- Shareware
- Spectrum emulator
- Spectrum game classics
- Review index
- 8-bit programs

Spectrum emulator: Classic play

The MZX 1.10 Spectrum Emulator comes on this month's subscription disk, being one of the three Spectrum emulators available for the Archimedes. This version comes with two classic games – Chuckie Egg and Crystal Caves – and is the third release of the ARM Unlimited ZX Spectrum Emulator.

MZX installs on to the iconbar in the usual way or you can click on a file of type SNA (&CEF) or Z80 (&CEE) which will also install the icon bar icon, but will pre-load the snapshot file.

To start up the emulation, click on the iconbar icon and Select opens a multitasking MZX window – Adjust switches to single tasking mode. In multitasking mode, clicking Select in the emulation window will allow keys to be

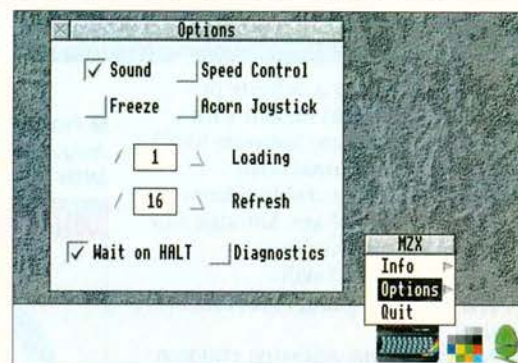
interpreted as Spectrum keypresses.

At any time after starting the emulator, you may load a snapshot file of type SNA or Z80 by dragging it to the iconbar or dragging it into the !MZX emulation window.

You have control over sound, speed control, loading, window redraw in multitasking mode and a pause option. In addition you can switch between keyboard and joystick and a diagnostic program to help discover why a certain snapshot may not work. All have keyboard shortcuts:

Freeze	Alt+F9
Unfreeze	Alt+F10
Sound on	Alt+F5
Sound off	Alt+F6
Increase loading	Alt+F4
Decrease loading	Alt+F3
Volume up	Alt+F8
Volume down	Alt+F7

Snapshots can be saved by pressing Alt+F2, while pressing Alt+R has the same effect as the Spectrum 48+ reset button. By the way, this version will multitask on the Risc PC but it won't single task.



● Setting the options for your Spectrum

● I'm stuck...
How do I move?



● Load up Draw and look at the old ZX keyboard – but trial and error works best

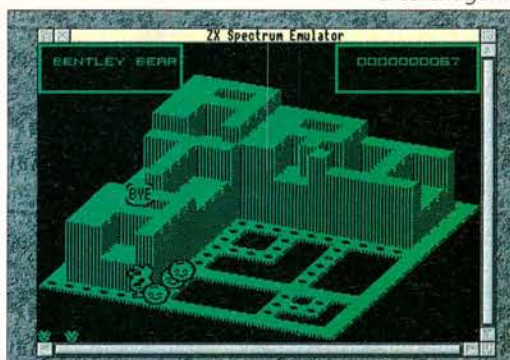


● Multitasking nostalgia



● Oh memories

● But it's still an excellent game



Public domain/shareware: Sporty programming

This month the subscription disk is full of public domain and shareware programs with something for everyone.

- League: Create and keep track of your own league football teams and results
- Event: An excellent shareware system giving you everything you need to create wimp programs

BIG

in Data Handling

BIG

in Maths

BIG

in Science

Data Analysis



PINPOINT

Practical Handling Skills



DATAFILES

Programming Language



FIRST LOGO

Schools Spreadsheet



ADVANTAGE

Datalogging



INSIGHT

State-of-the-art Spreadsheet



EUREKA

SMALL
on wasting your time

The fact is, you appreciate value-for-money software that's easy to use, powerful, perfect for young minds – and helps you make the most of your hours in the classroom. But you've got no time to delve through reams of advertising blurb simply to find the right package for your needs.

Thankfully, at Longman Logotron we offer an alternative approach. We know how good our software is, but we also know how precious your time is. So we're not going to inundate you with detailed information. Instead, we suggest you have a word with any of your colleagues or friends who've used one of our packages before. If they don't convince you to choose Longman Logotron, no amount of hyperbole on a page will.

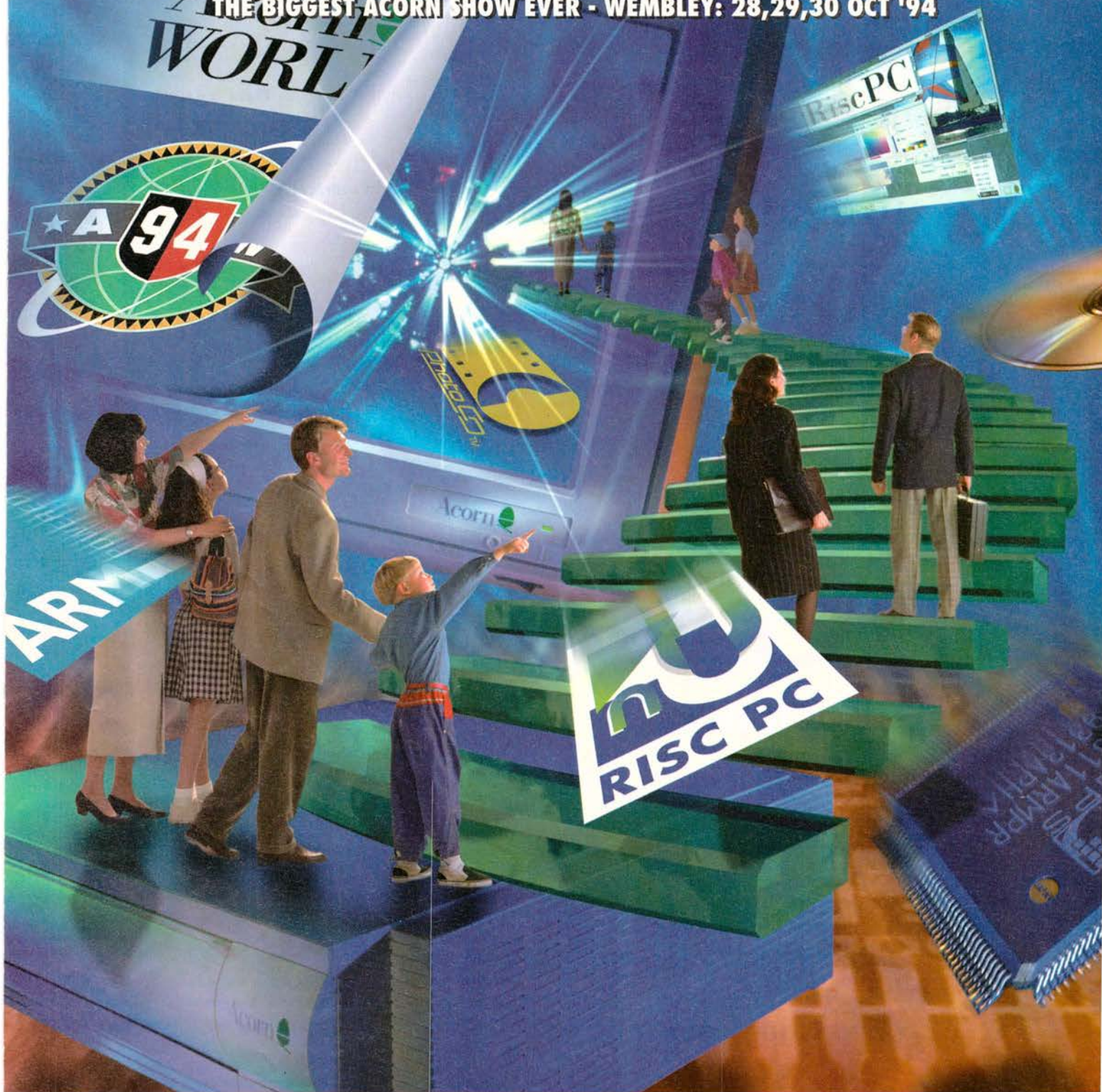
For a **FREE CATALOGUE** showing our comprehensive range of Acorn educational software, please call our **HELPLINE** on **0223 425558** anytime between 9am and 5.30pm (Answerphone evenings and weekends).



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Out for the count

Egyptian and Russian multiplication

TO multiply 349 by 26, the ancient Egyptians set out the sum like this: They started with 1 in the left-hand column and kept doubling until the next double would give a number which was more than the smaller factor (26 here).

In the right-hand column they wrote the larger factor (349 here) and kept doubling it as shown. Then, starting with the 16, the Egyptians worked out by subtraction whether the other numbers in the left-hand column were needed.

Here, $26 - 16 = 10$, so 8 will be needed, and $10 - 8 = 2$ so of the remaining numbers 4, 2 and 1 we will only need 2. Finally, they added only the numbers in the right-hand

column which corresponded to 16, 8 and 2 (these are 5584, 2792 and 698), crossing out the others, to give the product 9074.

1	349
2	698
4	1396
8	2792
16	5584
---	---
	9074

Russian multiplication is set out in a similar way. However, here you start with the smaller number and then halve it at each stage, ignoring any remainder, until you reach 1.

Alongside, you double the larger

factor each time, just as the Egyptians did. Now cross out the even numbers on the left together with their partners on the right. Lastly, add the remaining numbers in the right-hand column to give the product.

26	349
13	698
6	1396
3	2792
1	5584
---	---
	9074

The program gives you the choice between Egyptian and Russian multiplication, and contains four parts. The first, lines 40-150, includes the input routine which rejects products having more than nine digits since the machine will display them in scientific notation.

This part also causes the results to be printed in double height if the smaller factor is less than 512. Lines 160-250 calculate and print both columns of numbers, and then lines 260-380 move over to the right those numbers in the right-hand column which would not have been crossed out.

In the last part of the program, lines 390-460, the product is shown.

Jon Millington

Enter two numbers: 345 times 123

1	345
2	690
4	1380
8	2760
16	5520
32	11040
64	22080
---	---
	42435

Again? Press space

246	7654	19308
123		30616
61		
30	61232	122464
15		244928
7		489856
3		979712
1		1959424
---	---	---
		1959424

● Russian multiplication – it's even easier

● Egyptian multiplication – very easy to do

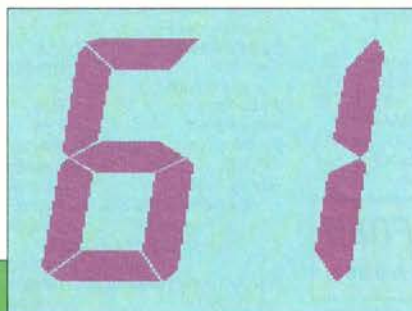
Countdown to digits

With giant-size calculator-style digits these two programs either count up from 00 to 99 and then start again from 00 or count down or give a random number. You choose which, and then decide on foreground and background colours.

You can speed the rate of counting or appearance of random numbers by pressing any key. The

Mode 2 version counts in seconds while the Mode 0 version gives higher resolution and shows how the seven elements making up the digits have to be switched in and out as counting progresses from one digit to the next.

Jon Millington



● Counting down with big digits in big modes



Housey housey

Another text adventure from the New Frontiers/Bazzasoft team that brought you *All the Colours of Darkness* which we published a while back. This one is rather silly so don't take it seriously, but as the title page says: *It's quite good really.*



Don't miss out on the great programs for the Acorn 8-bit machines that you can receive every month. From software written specially for Acorn Computing readers to an excellent selection of PD programs.

Subscribe now, turn to Page 40

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If your subscription disk has a physical fault – doughnut won't rotate in the sleeve, disk errors and so on – please return it for replacement to:

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If there seems to be a fault with one of the programs please contact us at the magazine by post describing your machine set-up and exactly what happens when you run the problem program.



SOFTWARE

1 out of 10
 - Dinosaurs, Driving Test, Early Essentials (-6), English (6-16), French (6-16), Junior Essentials (5-11), Maths Algebra (6-16), Maths Number (6-16), Maths Statistics (6-16), Spelling each £18
 - German, Italian, Science, Spanish each £POA

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 Access for A3020/A4000 Acorn £138
 Access for A5000 Acorn £143
 Access for Risc PC 600 Acorn £118
 Acorn Advance Acorn £88
 - Primary Licence £183
 - Secondary Licence £442
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 Almanac 3 Stallion £64
 Amazing Maths, KS1-4 Cambridgeshire £19
 Animated Numbers, age 3-6 Sherston £19
 Apollonius PDT Oak £149
 ArcFax David Pilling £28
 ArcFS 2 Vertical Twist £20
 Archimedes Assembly Language Dabs vo £15
 - with disc £22

We'll be changing the style of our ads over the next couple of months.

You'll notice that the length of this list has already been reduced. The number of Acorn products keeps growing, and until now we were listing a substantial proportion of them. It's become an impractical goal for a magazine advert. One problem is that we have to set prices a month before you see them, by which time quite a few will be out of date.

BUT ...

Archimedes Game Maker's Manual Sigma vo £15
 Archivist Pro Oregon £36
 Arcterm 7 Serial Port £58
 Adventure - I ... The Romans, age 10-12; II ... The Egyptians, age 8-9; III ... The Vikings, age 7-11 - each Sherston £25
 Armlock Digital Services £33
 Sherston £37
 ArtWorks CC £112
 - network licence £650
 - site licence £545
 ArtWorks CD CC £153
 ArtWorks Made Easy Dabs vo £15
 AudioWorks CC £45
 Acorn £366
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Aggressive responses

THE Education and Leisure Software Producers Association recently bowed to public pressure and introduced a grading scheme for computer games. This is, of course, a good thing, considering the content of some games.

However, in the case of ELSPA's scheme, it is debatable whether there is either any point or, in fact, if it was done to control who plays the game at all. Unlike, say, the film and video classifications, the most serious deficiency of this software equivalent is that it isn't legally enforceable.

I have personal doubts as to the efficacy of legal enforcement on this type of thing anyway but, knowing the way children think (having been one myself a while back) and also knowing the contorted lengths businesses will go to increase their sales, I'm sure it didn't slip ELSPA's mind that by making something forbidden you increase its desirability, and with no legal enforcement behind it, the forbidden becomes accessible.

It gives ELSPA's members the excuse that they are being *responsible* when, if truth be told, they are adding another marketing weapon to the boxes.

With the continuing convergence of the film, music and computer game industries the use of separate grading systems becomes an unnecessary complication. And with the advent of digital superhighways (don't you just love buzz words) it's a waste of time.

Once upon a time, just 12 years ago or so, the only place you could

see films was the cinema. Film grading could be enforced fairly well, though the dedicated few would still steal the forbidden fruit. But it wasn't *your* problem.

The invention of the home video player created the demand for video shops which supplied all your favourite films on demand – as long as you could be bothered to go out and find what you wanted.

But if you did get something *unsuitable* for the younger age groups it would be up to *you* to decide what to do with video when you weren't around.

With superhighways the problem intensifies, because now *every* video is available whether you intend to view it or not. And it's not just films, it's course, music, books, computer games, encyclopedias and so on.

Safeguards will, of course, be built-in to prevent uncontrolled access to all areas of the database – at least I'm sure that's what the manufacturers will say.

There are certain advantages to the centralised database. It's much easier to control what's available so you can ensure that undesirable material simply isn't put on. So the more unpleasant features of the video society will be avoided, or so it seems.

But that's only on the national scale, at this level it is possible to have these restrictions. But just as the telephone network expanded internationally, as e-mail slowly grew over the years to the point where the Internet provides total communication across the world, so the national digital superhighways

will become interconnected and *anything* will be available.

There are those who will seek to stop this expansion, for our own good. But, contrary to the hopes of those do-gooders who seek to dictate what we can and cannot watch on our screens, it can't be stopped.

So we come back to the imperfections of the human race and the fact that everything that comes out of the superhighway must be graded in a consistent way.

Music, of course, would only have two gradings, Universal and Uc (especially suitable for children), although the do-gooders might want Heavy Metal to be classified as an X, or not allowed at all.

But that can't work either – on a national level yes, but internationally? No way.

So the decision on what is acceptable and what is not comes down to personal judgement. And people are, unfortunately, fallible.



Steve Turnbull reveals some of the dangers of the digital superhighway

Steve Turnbull – Editor

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12 issue subscription rate: £34.95 UK, £49.95 EEC, £64.95 World, (40T and 80T BBC disk machines: £26.95 UK, £41.95 EEC, £56.95 World)
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Published by: Europress Publications Limited, Europa House, Adlington Park, Macclesfield SK10 4NP.

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News Trade Distribution: Comag 0895 444055

Printed in the UK by Duncan Webb Offset

Interactive multimedia — the next big thing

JOURNEY to Acorn's old Newmarket Road base in Cambridge and you'll see a re-vamp taking place. The reason is the establishment of a new Acorn wing — OM (Online Media). This sees Acorn's bid for the £12.5 billion market in interactive multimedia and puts it at the forefront of other interested parties: Philips CDI, 3D0, Apple, IBM, Hewlett Packard and General Instruments.

The aim of OM is to bring affordable interactive multimedia products and services to the huge market emerging from the *information superhighway*.

Following Acorn's belief in taking in partners, OM will be working with Olivetti, ARM Ltd, Advanced Telecommunications Modules Ltd (ATML), BNR/Northern Telecom, Anglia TV and Cambridge Cable. Talks are also under way with

News International, Oracle, BT and MAI to name a few.

The product itself is a black box situated on or under your TV with optional CD-Rom drive, switched joystick port, parallel printer port and DRAM upgrades.

You can also add modems via a serial port and there will be alternative input devices for a wide range of custom requirements: Keyboard, mouse, tracker ball and devices for disabled users.

But what does it do?

Interactive multimedia is a two-way process. MPEG digital data and compression services and the set-top-box (STB) to control them means you can access good-quality video and digital audio down existing telephone or cable connections. When and how much is up to you.

However, as the STB is fully interactive you can access reference databanks, take part in education, training, video conferencing and obtain specialist advice from expert systems. You could even use the

system for video security and appliance control as well as connection to Internet.

Services are accessed by keying in a PIN number providing restricted access for children. As the system is fully interactive you can personalise the information — and advertising — delivered to you and save favourite CD tracks, for instance, to a rented storage area or play interactive multi-player games across the country.

As we go to press, talks are taking place with many different companies about products they want to put into this system that will go under the title of *content providers*.

OM admitted to having been somewhat overwhelmed by the amount of people who want to become *content providers* for a host of different services for the trials which are due to start in Cambridge in November. There will be no exclusive arrangements on content and OM see a set of standards emerging

for the creation of content.

Online Media's revenue will come from the supply of the set-top-box equipment, but in the longer term OM plan to offer design licence sales, authoring software and a range of on-line services and consultancy.

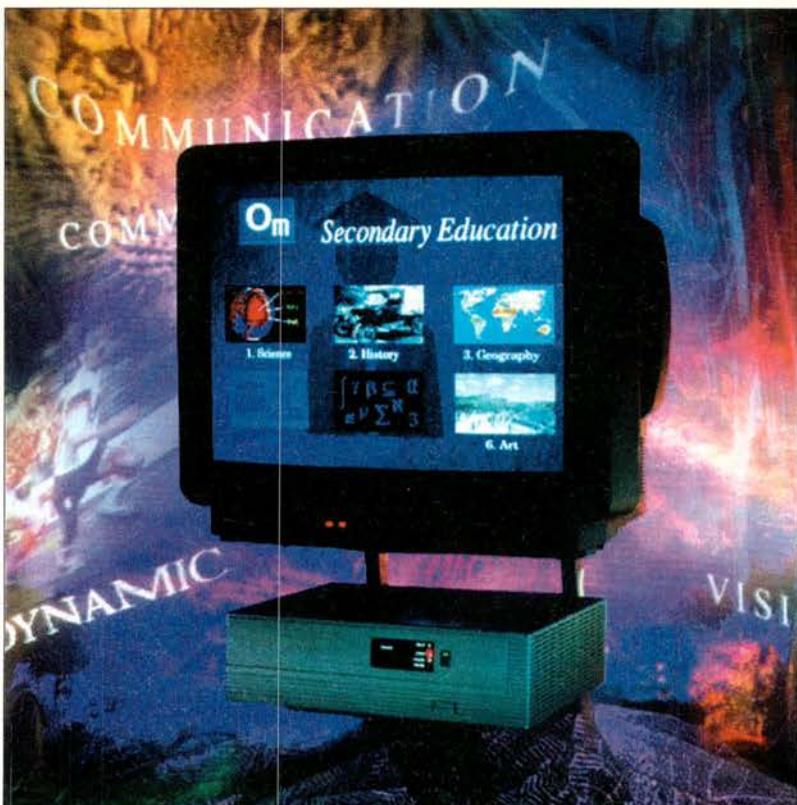
Though the initial team of 20 Acorn staff headed by Malcolm Bird is already in situ, they are conducting interviews to increase their numbers.

The Home Service screens available at the London launch showed programs familiar to most Acorn users: Anglia TV's CD-Rom software, Sherston's Naughty Stories and the Acorn Computing cover disk demo version of Superior's Technodream.

Minimal changes are needed to make programs work on the box which is effectively a Risc PC in disguise. However, the ability to view movies, sport and live news, as well as conduct shopping and banking all with a remote



● Malcolm Bird — OM's chief executive



● OM's STB — Set-Top-Box

Games seesaw

THE UK games market is feeling the pinch, as sales dipped in value by four per cent in 1993 and look set to fall again this year. Research company Mintel's recent report assesses that the UK market for computer and video games was worth £670 million in 1993, down from 1992's £700 million.

This news leaves the Acorn market basically unscathed, as games do not play a major role in software or hardware sales.

For games players it is a two-edged sword. Some of the larger multi-platform games houses may feel the need to concentrate on major markets and strong products, others may see the answer in diversification. We can only wait and see.

Plain paper faxes

THE majority of fax machines give a thermal copy which fades with age or you could opt for a plain paper fax machine which is expensive. AnsaFax from Onyx Associates (0252 310595) will convert almost any printer into a Group 3 plain paper fax receiver for only £299.

AnsaFax is simple to install, recognising incoming fax calls and storing up to 40 fax pages. It will then transmit the messages to the printer whenever you want. In addition PIN number security means you keep complete confidentiality.

AnsaFax comes with a parallel/serial print sharer for flexibility. Furthermore, if you own a conventional fax machine AnsaFax can convert it into a plain paper photocopy.

Dutch bombshell

A NEW games house, run by David Kelly, has started business in Amsterdam. Called Titansoft, the first release will be Bombshell which is based on the arcade *dynablast*. The release date is set for the end of autumn with a price point of £25.95.

Also in the pipeline is a program for scrolling video and film credits called VidCraw. You can contact Titansoft at Jan Evertsenstraat 369, 1061 XT Amsterdam, Holland.

control handset, takes the technology to a new and much wider audience.

Is it possible to convert this box into a true computer? There are no initial plans for this as the price is seen as potentially prohibitive but the launch models did have a joystick port, though this may be integrated into an infra-red remote control hand unit.

The flexibility synonymous with Acorn machines is one of OM's major strengths, allowing access to this superhighway from common copper phone cabling, to COAX and fibre optics in the future as well as satellite support.

Malcolm Bird stressed that OM must be able to work with them all as they cannot second guess whether one or all will have a place in the technology in future years.

"The different installed infrastructure and regulatory controls across Europe allow us to gain experience across a range of technologies and develop an early lead."

When can you expect to see a commercial product? The trails will take place over the next 18 months and 1996 is set as the date for genuine commercial activity.

In the long term, TV companies may put the technology into their TVs which is why OM are already talking to the Japanese and Korean TV manufacturers.

However, it is possible that different devices will emerge with TVs becoming a display medium hung on walls throughout the house. After all, this is not a UK or European development but one with world-wide ramifications.

The partners

Anglia TV – main programme provider with new bulletins, current affairs, weather forecasts and educational CD-Rom software for science, history and

geography. They will also coordinate input from other suppliers.

ARM Ltd – has developed the chips on which the decoders are based. OM's boxes will incorporate up to four ARM-designed chips and can be connected by high capacity Asynchronous Transfer Mode network connections which allows OM to deliver true Video-On-Demand capability.

ATML – has developed the innovative ATM (Asynchronous Transfer Mode) technology for the set-top box. This provides ARM connectivity into the home at very low cost.

It will facilitate the introduction of multimedia services – common to business such as conferencing – into the home. Future versions will also exploit the custom-designed ATOM chip, based on technology licensed from Olivetti Research which is built around the ARM RISC processor and will further reduce costs.

BNR Europe – subsidiary of Northern Telecom Europe. Setting up reciprocal technology demonstration centres at BNR Harlow and Online Media's HQ in Cambridge. Their products and developments for this market will be used to demonstrate and trial the end-to-end transmission and network management required. Harlow is the centre for the development of their global product line for the cable TV industry.

Cambridge Cable – involved in the three phase trials starting in November with tens, then hundreds and then thousands of users.

Acorn Computing and Europress Publications are planning to provide services on this system.



A3020 upgrade disaster

If you've bought an 2Mb A3020 recently then beware if you try to upgrade it to 4Mb, the chances are that it won't work. The problem came into view when one large educational establishment found that all of their A3020's failed when upgraded to 4Mb.

Due to a *minor* design defect, 1,000 A3020s are operating on the limit of their tolerances and adding the extra memory pushes them past it.

The problem is caused by a combination of factors including an incorrect resistor, the ARM250 being at its tolerance limit and the memory chips being

self-refreshing.

The added load of additional memory crashes the machine before it even starts up and results in the system test software flashing out the error number in morse code.

The worst of it is that even adding an oscilloscope in order to diagnose the trouble has the same disastrous effect.

Acorn are aware of the problem and know the serial numbers of the affected machines. The necessary instructions have gone out to service centres and affected machines will be fixed under warranty.

Narrowing the margins

FOR a number of musicians the CD is taking on a new significance and depth. Why just have music on a CD when you can have moving words and images for no greater cost?

Peter Gabriel was the first to enter this alternate route to multimedia with the release of *Xplora 1: Peter Gabriel's Secret World*. But he is not going to be alone for long with Todd Rundgren, Duran Duran, David Bowie and Prince about to join the fray.

What do you get? Well, the initial Mac version is laid out as a Hypercard stack and contains 100 minutes of video, 30 minutes of audio and more than 100 full-colour photographic images and a lot of text.

Living up to ex-Genesis Gabriel's new title of *experience designer*, *Xplora 1* covers diverse subjects from technology and

human rights to world music.

This means that from the initial screen of a photo-fit Gabriel you can travel to a night at the BRIT awards, have a go on a Third World musical instrument or have a studio session with producer Brian Eno. Collect items as you go – adventure game-like – and you can gain access to more and more of the CD.

Xplora has been created for the Apple Mac but a PC version is under conversion, so those of you with PC cards and a good CD-Rom player will be able to access this shortly. The cost is £34.

Prince's *Prince Interactive* is selling now through HMV for £49.99 on PC and Mac and will go on general retail release later. This CD comes with puzzles and riddles linking previous music and video releases – definitely one for the fan.

Antipodean access

PTW Software will be distributing their KernPlus, Chemistry, Technical Clip-art, Klein FS and Equate in Australia through KidsRAM of New South Wales. All PTW products will be available from KidsRAM at prices cheaper than ordering directly from the UK.

PTW Software can be contacted at 72 Frosthole Crescent, Fareham, Hampshire PO15 6BG. Tel: 0329 289416. KidsRAM are at 241 Hawkesbury Road, Wimmalee, NSW 2777 Australia. Tel 047 54 4344.

C64 from RISC OS

IF YOU feel the lack of a facility to transfer Archimedes pictures and samples to a Commodore 64 then XL.C.US Software may have the answer. They are working on a service to transfer data between the two formats and if you are interested then write to XL.C.US Software at 21 Green Street, Milton Malsor, Northampton NN7 3AT.

Ram raid

IFEL (0752 847286) have released their 8Mb ram upgrades for A5000 and A3000 machines – versions for the 300 and 400 series are due shortly. The cost of these are £259 and £249 respectively and are compatible with ARM3 boards, colour cards, VIDC enhancers and so on.

The upgrades are supplied with two precision matched memory controller (MEMC) chips to ensure reliable operation at all times. It's recommended that you have the upgrades fitted progressively, as it usually involves replacing the existing surface mounted MEMC by a socket in order to receive the dual MEMC board.

IFEL provides a complete fitting service – collection, fitting and return – within three days.

Puzzling collection

FOR people who like brainteasers, Arch Angel (0392 422759) have the Drawfile Puzzle Collection on offer. This costs only £4.99 and provides a range of puzzles in drawfile format for solving on screen or paper.



● Supplement your knowledge and French vocabulary

French tiling

BRAIN Games (0482 649288) have released a supplementary disk for Tiles. This features 233 French cross-words using the GCSE Basic Level French vocabulary arranged in 16 directories corresponding with the GCSE syllabus.

The disk also holds eight new sprite sets giving a good variety of Tiles display. The latest version of Tiles – 3.29 – now comes with 30 boards and can accept board data which has been designed using the XWord application.

Brain Games have also added an alternative method of moving Tiles around the screen for people with special needs. Tiles costs £19.75.

Ordnance surveyed

FOR anyone involved in geography, Minerva (0392 437756) have a package which will enable educational establishments to import Ordnance Survey Digital Map Data on to Acorn RISC OS computers.

Called Map Importer, this software converts Ordnance Survey files into Draw format – you can be selective about which data is imported and saved. Furthermore, you could choose to

import data with all the major roads removed or add additional roads and buildings.

Other facilities allow you to pan and zoom maps and Map Importer fully understands OS Map references. It is also compatible with Impression, Genesis, Pendown and Primeword.

Map Importer costs £29 but a copyright licence is required for schools who are not covered by the Local Authority Service Level Agreement. Ordnance Survey Digital Map Data can be obtained under licence from the OS Digital Sales Department (0703 792773).



Training on the horizon

NEW Acorn training courses are due to begin this autumn by Horizon IT Education Services (0935 862990). These will take the form of a series of weekend training courses at Rumwell Manor country house hotel in Taunton, Somerset.

The courses will cover such packages as Impression Style and Publisher, ArtWorks and Prophet and are fully endorsed by the companies involved. You will also be able to make use of the latest equipment and peripherals.

Each course costs £250 (inc VAT) and includes tuition, meals and accommodation. There is a special rate of £85 for a non-participating accompanying person.

Courses

Acorns for Beginners	23-25 September	11-12 November
Impression for Beginners	30 Sept-2 October	18-20 November
Advanced Impression DTP	7-9 October	25-27 November
ArtWorks Technique	4-6 November	9-12 December
Acorn's Business Machine	14-16 October	2-4 December



● Rumwell Manor, Somerset – house of learning

Rooting around the past

MANY people – including Alex Haley when writing *Roots* – have turned to the Church of the Latter Day Saints to help with their research. One of the Mormon's belief is that religious rites, such as marriage and baptisms, must be performed to receive your heavenly benefits. If necessary, ceremonies which should have taken place 100 years ago can be performed by proxy today.

This work is important to the Mormons, so they have one of the largest and fastest computers in the world recording millions of people and their relationships.

Recently a 30Gb database has been released to the British public with the

Mormons encouraging people to download information for use with their own home computers.

If you are interested in family history you can easily profit from this public domain information – there is no fee for using their computers or for downloading the information.

You may find that your family tree is already on computer along with the names and addresses of people working on the same tree. There are five databases held on CD-Rom: Ancestral File, International Genealogical Index, US Social Security Death Index, US Military Index and the Family History Library Catalogue.

These all contain the names of

deceased people and if living individuals are listed their personal details are blocked out.

The information is available in MS-Dos format with data exchanged as GEDCOM files which is an international method for transmitting family tree information.

GEDCOM is a simple ascii code with each line of data prefaced by a four letter code indicating what the data refers to. Each record will link a person to a family and a spouse.

There are 70 computerised centres in the UK and can be found in your local telephone directory under *Church of Jesus Christ of Latter Day Saints – Family History*.

Acorn's CD portion

INFORMATION on the £4.5 million funding has now been provided by the Department for Education under the CD-Rom in Primary Initiative Scheme. This shows that the majority was spent on Acorn's A5000 multimedia system with a Cumana 300 CD-Rom Photo CD capable drive, SVGA colour monitor, headphones, speakers and seven CD titles.

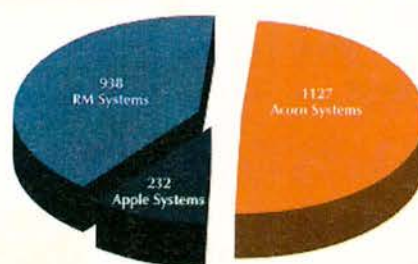
These have been installed in primary schools during May and June and follows a successful pilot scheme undertaken by NCET. Full training has been provided for all those schools nominated by their Local Education Authority.

Commenting on the Initiative Scheme, Cumana's Managing Director, John Simnett said, "At the time of the last government survey in 1992,

each primary school had an average of seven computers, compared with 2.5 in 1988.

This latest funding will give an enormous boost to UK primary schools – they will now be able to bring the National Curriculum alive with the powerful, stimulating and interactive learning medium of CD-Rom."

£4.5m DFE Funding - CD-ROM in Primary Initiative

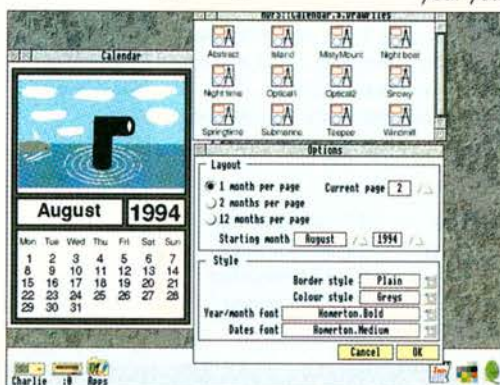


Days and dates

CALENDAR is a new product aimed at schools from Kudlian Soft (0926 851147). This £25 package aims to let children create their own pictures using a painting or drawing package and drop the draw or sprite files into the provided calendar layouts. Calendar settings can then be saved as a text file.

Kudlian's Gary Atkinson reports that initial trials suggested the need of a version just for home use which would incorporate a memo style layout. Kudlian are already looking into this for an expanded version available later in the year. Watch this space.

● Personalise your year



More sums please



HONORMEAD Software's entire collection of software has now been transferred to Resource's (0509 672222) catalogue, including Complete the Picture, Scribble and the Learning to use... and Graphics packs.

Resource have also released SUMone, a new maths program

containing a graduated range of mathematical tasks from counting to ordering and less than for about Year 1 ages.

A variety of tasks and activities are supplemented by colour pictures, animation and music. You will need 2Mb ram though. The cost of SUMone is £29.95.

What's on

RISC PC Open Day
Desborough, Northants
23 July 1994
Contact: TMJ Computer Software (0532 762713)

Live '94
Earls Court, London
20-25 September 1994
Contact: Live '94 (0891 500103)

The BBC's Big Bash
NEC, Birmingham
6-9 October
Contact: BBC Haymarket Exhibitions (021-767 4111)

Acorn World
Wembley, London
29-31 October 1994
Contact: Vector Services (0933 279300)

European Technology in Learning '94
NEC, Birmingham
16-18 November 1994
Contact: BIC (0254 676025)

RESOURCE '94
Doncaster Racecourse
25 November 1994
Contact: Resource (0509 672222)

Sing-a-long-a-Duncan

IF YOU want to give your studies of Macbeth a different approach, then take a look at Karaoke Macbeth now available on CD-Rom from Cumana (0483 503121) and converted to the RISC OS machines by Animated Pixels.

The screen shows animated screens from Shakespeare's *Scottish Play* and you can play one or more roles with or without the text on screen. So you can play it to yourself or have it as an on-screen prompt during a play or as a replacement actor during rehearsals.



● Play the role of the doomed man

Land of the giants

IN CASE you've missed it, one of the key phrases when it comes to screen-based entertainment is *interactive* while the buzz word for 1994 must be *superhighways*. Look up and you'll see the large US telecommunications companies about to make their claim on the home computer market.

With consoles and PCs in their sites, the US-based company CES – the fourth largest publicly-held telecommunications company in the world – aim to begin publishing entertainment and *edutainment* titles later this year. No worry there, but they also plan to network games through cable or satellite links. But they are not alone.

With record £2 billion profits in their pockets this year, British Telecom are joining the race for the *information superhighway* with the likes of Time-Warner, Microsoft and TCI in the break.

As far as the mega-buck companies are concerned, the user convenience of every home interacting with a variety of services such as magazines, shopping, games and movies is more than outshone by the huge profits to be made.

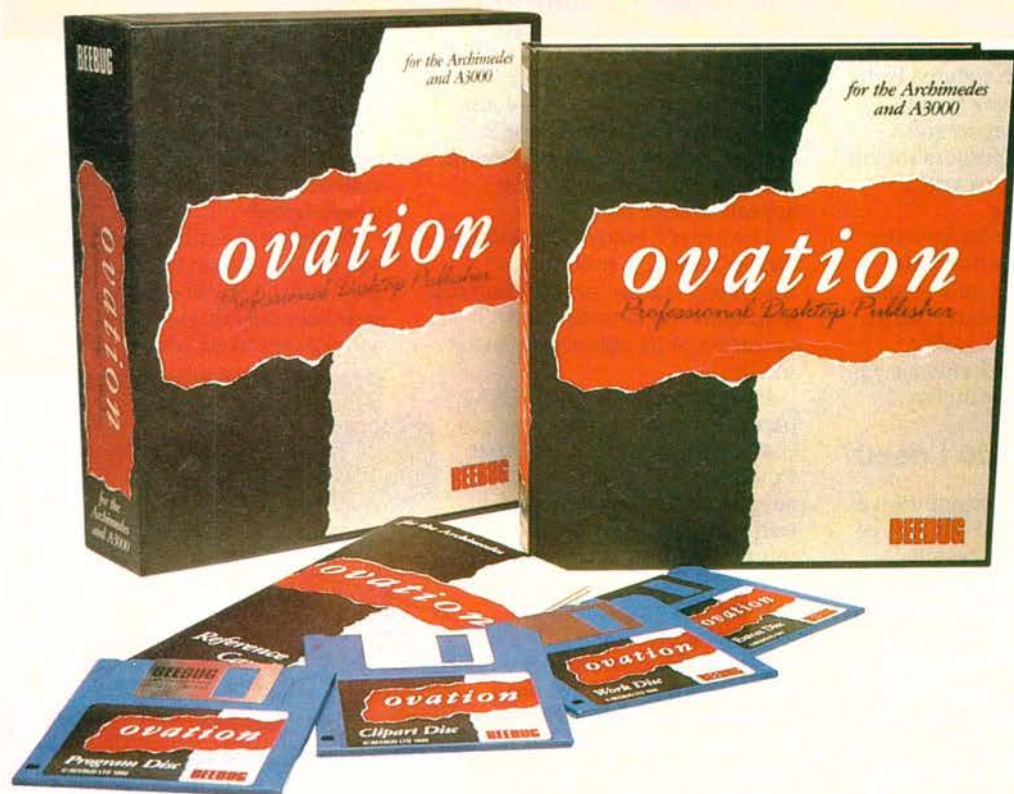
Government restrictions on BT owning or broadcasting television programmes until 2001 has been circumvented with the creation of a film service called Movie Choice. The concept has already been trialed in California and Florida but BT are planning to put their system – Home Services – to the test in Ipswich using Apple Motorola technology.

Encyclopaedic dealing

ANGLIA Television Media Development (0603 615151) has signed a marketing and distribution deal with Encyclopaedia Britannica who will now handle the world distribution of Anglia's CD-Rom *Understanding the Body*, with options on a number of other titles developed for school use.

Anglia's Peter Stibbons commented, "We are well placed to take advantage of the rapid growth of CD-Rom publishing forecast over the next few years."

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RISC

developments

WHEN perusing software stands I cannot help but admire the beautiful colour screen dumps adorning the walls and display panels. Colour printing opens up a whole new dimension of computer use, as it promises what-you-see-is-what-you-get in colour.

For children particularly it can prove a motivating influence on the use of art and DTP software. In the past however, for most home and school computer owners the promise of colour printing has frequently meant a compromise in both quality and colour rendering.

The problem has been that of cost. Just like photography some years ago, when colour was always much more expensive than monochrome, so it has been with colour printing.

In those days, where a monochrome dot matrix like the Star LC24/10 could be had for about £280 if you shopped around, the only available colour printer offering consistent output and quality was the Integrex Colourjet 132, with a hefty price tag of around £550.

The majority of colour printers that did find their way into homes and schools tended to be of the dot matrix variety which suffered badly from weak colours, dehydration and colour contamination of ribbons and banding.

Today you can still pay the same amount for a colour inkjet printer but in terms of quality,

running costs and convenience you get a lot more for your money.

Which printer do I need?

This is not such an easy question as it first appears as the whole area of computer printing is a rapidly developing one, with some companies like Canon, for example, bringing out new and improved models while others, like Citizen, are jumping on the colour inkjet bandwagon. All good news for the consumer!

The following printers were all tested with nothing more than 80 gsm photocopy paper which is cheap and readily available. All the printers reviewed here can print on



● Canon output from the BJC-600

● ...and on recycled paper



envelopes, labels and OHP transparencies, as well as plain copy paper and the coated paper specially designed for inkjets.

Although more expensive, it is worth keeping a small supply of this latter item as the improvement in print quality is substantial and is worth having for display work or for special occasions.

The Integrex solution

Ironically, it is now Integrex which offers the lowest entry point into colour inkjets with their Colourjet 132. In its new Series 2 guise it boasts a number of improvements, not least of which is its more appealing price tag.

The Series 2 enjoys 300 dots per inch print which produces smoother, sharper graphics and text, maintains the virtually silent operation of its predecessor and is smaller.

It prints on plain or coated A4 paper and not the expensive coated roll paper of the original Colourjet. The optional, automatic 70 sheet feeder is well worth the extra as it minimises paper jams in busy environments.

Some will miss the ability to print banners on roll paper but, for convenience and cost, A4 copy paper can't be beaten even though it does suffer from saturation at times.

The Series 2 includes one of two RISC OS drivers – from Oak Solutions – but it is also HP Deskjet 500C compatible.



PRODUCT SPOTLIGHT

Product: The Colourjet Series 2
Price: £239 (£40 Sheet feeder)
Supplier: Integrex Systems, Church
Gresley, Swadlincote, Derbyshire
DE11 9PT.
Tel: 0283 550880

PRODUCT SPOTLIGHT

Product: Deskjet 550C
Price: £399 (discounted price)
Supplier: Hewlett-Packard, Cain
Road, Bracknell, Berkshire RG12
1HN.
Tel: 0344 360000

you must accept a compromise in performance and quality.

Hewlett-Packard's approach

Hewlett-Packard have established a reputation for high quality inkjet printers that few other companies can match. It is not by accident that their Deskjet series has virtually been adopted as an industry standard.

Hewlett Packard must also take the credit for bringing colour printing into the home and classroom with their low cost Deskjet 500C. In essence this is a DJ-500 monochrome printer which permits the black ink cartridge to be swapped for the colour one whenever colour printing is required.

Unfortunately, although the system works well, the inconvenience of swapping cartridges can prove too demanding at times.

Like the Integrex, blacks come out as a muddy combination of colours. However, this printer can be bought with substantial discounts and if you are prepared to put up with the inconvenience, offers excellent value for money.

The HP Deskjet 550C is the latest version of what has become the defacto colour inkjet printer and represents the next step up the inkjet ladder.

Although, this printer holds both colour and black cartridges it still mixes colours to emulate black in colour images. Unlike the DJ-500C, it does have the advantage of not

As computer awareness rises so do expectations. How good are the latest range of colour printers? Chris Drage investigates

having to swap cartridges when mono printing is required. Similarly, it comes with an automatic A4 sheet feeder built in.

The 550C produces near laser quality (300 dpi) text and even the poorer draft quality is very good. Text printing is speedy, which is more than can be said for printing graphics which tend to be slow. Using Oak printer drivers (for RISC OS 3) speeds things up a bit but the only substantial increase in speed occurs with a Computer Concepts' Turbo Driver (also RISC OS 3 only).

The results you get from the 550C are very good indeed. Overall it is a very versatile monochrome printer which can also print in colour when required.



● Integrex's output on coated paper



The Canon phenomena

Canon have justifiably become market leaders in inkjet printers thanks in no small part to their bubblejet technology which has delivered silent, high-quality printing at prices home users, and schools, can afford.

With the success of its BJ-10e and larger BJ-200 mono printers, the way was open for a colour bubblejet and the BJC-800 quickly followed. Outstanding performance was reported in almost every review.

In fact, the BJC-800 had only one major problem – at just under £2,000 RRP it simply cost

It's a colourful world

too much for the average user. Hence the launch of the BJC-600, a printer having virtually the same performance and output but at a reasonable cost.

Bubblejet technology is simply a means of getting a small bubble of ink from a tiny jet nozzle on to the paper with clarity and without causing clogging in the inkjet in the process – a problem with the older, established methods.

The process was discovered quite by accident and by 1977, Canon were quick to patent it. It has become the most widely used technology in the world of inkjet printers.

The colour printer looks very much like a larger version of the mono BJ-200 printer and occupies about the same space as an Integrex Colourjet series 2. It has a smaller footprint than either of the HP printers, neither does it require any external power supply unit.

Its range of features is quite extensive and includes an integral 100 sheet/10 envelope, automatic sheet feeder which takes plain A4, 80 gsm stationery, manila envelopes or OHP transparencies.

Installing the four colour ink cartridges is a very simple task as each colour has its own cartridge – cyan, magenta, yellow and black.

The print head has an automatic cleaning function which negates many of the problems usually

PRODUCT SPOTLIGHT

Product: Canon BJC-600 + Turbo Driver

Price: £469

Supplier: Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX.

Tel: 0442 63933



associated with inkjets clogging their jets.

The ink used in this printer also warrants special mention as it possesses a new, faster drying formula which results in full colour prints coming out dry, without any buckling or blurring, and unexpected colour mixes characteristic of cheaper inkjets printing solid colours on plain paper.

The advantage of having separate cartridges for each colour becomes apparent, especially when a colour becomes exhausted – you simply

slot in a replacement for that colour without wasting the others.

Being transparent it is easy to see how much ink is left in each cartridge. In the same circumstances other colour inkjets require a complete change of cartridge,

even though other colours have not run out.

Similarly, this printer can print true black in colour graphics without any fuss. The range of controls on the top of the printer are consistent with other Canon Bubblejets utilising easy selection of print mode settings with push buttons, with LED indicators showing current status and printing problems.

Computer Concepts' BJC-600 Turbodriven not only provides faster return of control back to the computer but also offers improved

grey scaling – the improvements are substantial.

However, a word of caution. Be careful to check that all your existing software will work with it. I

got a nasty shock when I discovered that Kudlian Soft's lovely little Banner program refused to print with the BJC-600 Turbodriven.

In operation the BJC-600 is quiet and unobtrusive producing lovely colour prints without a hint of banding or colour saturation. Indeed the output is quite remarkable, producing reasonably crisp text and colour outlines even on cheap, recycled copy paper.

Inserting replacement cartridges is very straightforward as is any of the general maintenance operations – not that there are many of those to perform.

Thermal Stars

The last colour printer is not even an inkjet, nor is it a dot matrix or laser – it uses a technique called thermal transfer printing and the Star SJ-144 is the first low-cost printer to utilise it. This is quite a departure for Star Micronics, a company associated more with low cost dot matrix and quality laser printers.

The thermal transfer method they adopt uses a wax-type ink which is actually melted onto the paper from a carrier ribbon containing a separate carrier

for each primary colour – cyan, magenta, yellow and black, each of which can be melted to represent a pixel or not.

As they are melted from a solid form the inks can be made more viscous than liquid ink, thus preventing smudging and colour contamination while permitting good quality output on almost any grade of paper or film.

Each page is printed in strips similar to a dot matrix, which gives some banding like a dot matrix printer although the SJ-144 can be finely tuned to largely negate this effect.

The printer itself has a small footprint, has a 30 sheet paper feeder and push button controls on the top. One of the more unusual controls is a colour intensity wheel which can be adjusted during the first print to obtain the desired colour balance.

A perspex front cover opens to permit the ink cartridges to be inserted. The sample machine came with black, colour and colour-transparency cartridges. The SJ-144 cleverly detects the codes being sent

3216	Internal	CG Times Italic	PS	14
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
3216	Internal	CG Times	PS	14
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
3216	Internal	CG Times Italic	PS	10
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
3216	Internal	CG Times	PS	10
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
3216	Internal	CG Times Italic	PS	8
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
3216	Internal	Univers	PS	8
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
3216	Internal	CG Times	PS	8
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				
0123456789:;<=>?@ABCDEFGHIJKLMNPQRSTUUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{ }				

PRODUCT SPOTLIGHT

Product: Star SJ-144

Price: £475 (street price)

Supplier: Star Micronics, Star House, Peregrine Road, Gomm Road, High Wycombe, Bucks HP13 7DL.

Tel: 0494 471111



● Deskjet 550C's output



● ...or a black and white Canon version



to it and configures its emulation automatically.

Unfortunately, there isn't a RISC OS printer driver specifically for this printer – the most suitable being an Epson LQ-860 driver. The SJ-144 can support 360 dpi but the LQ-860 driver only supports colour up to 180 dpi, the net result of which is high quality monochrome prints but correspondingly disappointing colour prints.

Unlike colour dot matrix ribbons which are continuous, the SJ-144 ribbon ran until the end of the cartridge when they are deemed exhausted.

On the plus side, it means you never get colour deterioration over time and even if a print is only partially completed when the ribbon becomes exhausted, the printer pauses until a new one is inserted then continues the job.

On the down side, if you are printing images in which one colour predominates, a ribbon can become exhausted leaving most of another colour ink intact – a problem inherent of all-colours-in-one-box cartridges.

Swapping cartridges is simplicity itself, which is just as well as I found myself doing this quite often. Until a suitable printer driver becomes available the SJ-144 cannot hope to compete with a turbo-driven BJC-600 in terms of speed and colour output.

At the rate I went through cartridges during the evaluation period, I suspect it will prove just a tad too expensive to operate as well.

Summing up

In the past, colour printing has either been too costly or too basic. Employing inkjet technology neatly overcomes the

Running costs

Actual running costs for colour printers are more difficult to quantify. The best policy is probably to stick mainly to monochrome/greyscale work – draft prints – using colour sparingly and to best effect where it counts. The following table offers a price guide/comparison:

Printer	Colour cartridge RRP Price	Mono cartridge RRP price	Approx cost per page
Colourjet Series 2	£26.50	£14.63	colour 20p-25p* black 3p-5p*
Deskjet 550C	£27.00	£25.00	colour 38p-£1.20* black 2p-3p*
BJC-600	£8.00 each	£6.50	colour 5p-30p* black 2p*
SJ-144	£18.00	£18.00	colour 75p* black 20p-25p*

* These figures are based on the industry standard of 5 per cent of page coverage in black and 30 per cent coverage in colour

problems of banding, ribbon wear, drying out and discolouration common to the dot-matrix printers.

Each of the above printers can be recommended as they all performed well, appear rugged enough and – in the space of one month – worked reliably with a range of RISC OS compliant and coexistent software.

Inevitably, the choice based on the facilities offered – mode of operation and print quality and so on – is a subjective one depending on your needs current and future.

From a teacher's perspective and with the National English Curriculum's emphasis on presentation skills, there is increasing pressure for schools to purchase a colour printer as it is an essential resource in terms of both design and presentation.

A colour printer is an expensive item, therefore a primary school should seriously consider purchasing one for classes to share. Secondaries will undoubtedly have at least one on the network.

The Colourjet Series 2 quite obviously offers the most cost-effective entry into colour printing, but with compromises. If you are not interested in art/DTP applications but want, instead, to add a touch of



● Spot the difference



colour to your spreadsheets, texts and graphs then the Colourjet Series 2 will probably earn its keep well.

Similarly, there are good discounts on Deskjet 500C/550C – it pays to shop around to pick up the best discount you can. To my mind though the Canon BJC-600 undoubtedly offers the best compromise between quality and cost to date.

Overall this is an extremely impressive printer and coupled with Computer Concepts' TurboDriver, represents the best colour printing system to appear on Acorn computers so far. Would I go out and buy one? Yes I certainly did.



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The above price is for a Morley uncached SCSI card.

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The above include all cables, screws and instructions. All the above drives are Connor as used in the RiscPC.

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AUG 94



Jack of all trades, master of most...

Multimedia – What does it really mean?
Rob Miller investigates

MULTIMEDIA is an often abused term. Wherever you look these days, you'll see the term in everything from advertising to video games. Literally, it just means *many methods of communication* and in computer terms, its use is usually justified.

A true definition of the word *multimedia* is the combination of a number of communicable items used to present a piece of information.

Acorn's Replay system definitely falls into the category as it can use both sound and video to illustrate whatever information is being presented.

Hypertext-style programs such as Oak Solutions' Genesis also fall into the category of multimedia. Pages of information can be constructed from words, pictures, sound and video sequences to form multimedia presentations.

You might, at this point, think that television is multimedia. It is a combination of two media – sound and pictures – but what separates computer multimedia from this is the ability to link items in a logical way and then cross-reference them.

Also, the whole point about multimedia is that it is an *interactive* technology. Your response to different situations will affect what is displayed. The closest a normal TV comes is changing the channels.

Where does Multimedia fit?

Multimedia products have been around in the Acorn market for some time but it is only now, with the availability of graphics and sound hardware upgrades, plus the launch of new Risc PC600

range of computers, that they are making real inroads.

Although a standard Archimedes such as an A3000 is an excellent machine, perfectly capable of accomplishing a number of advanced tasks, recent advances in hardware have only just given it the capacity to qualify as a true multimedia machine.

The arrival of new architecture machines from Acorn will, I am sure, offer the user the chance to participate in the *real world* of multimedia.

Multimedia expansion

The Eagle M2 card is so called because it offers the facilities to create your own multimedia

productions – M2 or MM stands for MultiMedia. It will also enhance the power of your computer, enabling it to become a machine more suited to the presentation of multimedia.

There are two areas that the card addresses – sound and vision. In the case of sound, it will allow you to both record and playback sound to a high quality.

Picture-wise, it will digitise still and moving images, both in colour and mono. Finally, it is fitted with a standard Midi interface which is fully compatible with Acorn's now discontinued model.

The Eagle M2 package consists of a half-width podule which is compatible with any machine fitted with a standard two or four slot backplane. It will also function in the new Risc PC600.

A3000 users can fit it to the expansion slot on the back of their machines, and a suitable case can be purchased from Wild Vision for an additional cost.

It should also be noted that your computer should be fitted with RISC OS 3.1 (or greater) and have at least 2Mb of ram. The Eagle M2 card will not function with A3010, A3020 or A4000 computers and due to its complexity, is unlikely to be *converted* for use on these machines.

A number of software packages are



● TakeTwo's main window



included with the Eagle M2, with each one designed to control the various features of the hardware. *TakeTwo* controls all the grabbing of colour moving and still images, while an updated version of *Scanlight Plus* enables the capture of greyscale images.

AudioWorks handles the sound sampling side as well as sample playback and Midi control software is supplied in rom. A number of smaller utilities are also supplied, including Acorn's suite of *Replay* software.

Getting started

Installing the Eagle card is simple. Just remove a few screws, slot the

card into your backplane – if fitted – and connect a short ribbon cable from the podule to the computers main board.

Fitting instructions are supplied for all models of Acorn computers compatible

with the card and anyone competent with a screwdriver should have no problems at all.

There is a ribbon cable if you wish to make use of the sound playback and mixing facilities offered by the Eagle card. It joins on to the sound connector on the main computer circuit board and allows the Eagle card to *talk* directly to the computer's internal sound system.

All software can be installed on to a hard disk and in most cases it's a matter of copying the application from floppy to hard disk. A hard drive is not only

useful for making the software easier to use, but essential if you are going to make full use of the Eagle's features.

Lights, cameras and action...

Rather than try to cover all the areas in one go, I'll describe each one in turn, making reference to related ones where required.

The Eagle M2 is designed to accept a video feed (or signal) from a number of different sources. Sockets on the back of the card are provided for a standard video signal via a BNC socket, or from an SVHS video source via a special mini five-pin socket.

Virtually any type of video source can be connected to the Eagle M2 including standard VHS cameras and players, as well as VideoDiscs and still cameras such as the Ion from Canon.

It's even possible to use different standards and an NTSC option is provided for users of American/Canadian video hardware.

No actual cable is supplied for linking the video source to the Eagle card but making one is relatively easy and there are plenty of retailers who can supply ready-made cables for the less hardware-minded.

The number of combinations possible – BNC to phono, BNC to SCART and so on – would have made the cost of including all possible cables quite prohibitive, so I think Computer Concepts can justify leaving one out. Wild Vision can supply any cable required for a small additional cost.

TakeTwo is a standard RISC OS application and runs in the desktop. Loading it produces a small clapper board icon on the iconbar. From here, you can access the various picture controls, as well as the live video preview window.

Once you have linked up your video source, selecting the *Show Live Display* option will display a window on the desktop in which is shown the actual video picture.

A selection of VCR-style icons give control of the picture and a picture control window allows you to alter a number of parameters depending on your video source.

A set of radio buttons allow you to set up *TakeTwo* for your own particular video source. Controls

give you the option of Composite or S-Video, Tape or Live, and PAL or NTSC.

This should cover virtually any piece of standard video equipment you can care to mention and I found that everything I connected to the Eagle M2 – VCR, video camera and an NTSC still video camera – worked fine.

The way in which the incoming signal is displayed can be altered in a number of ways. Display options include Auto Zoom, where the size of the live picture changes depending on the size of the display window, or Pan and Scan, where the window literally shows a small section of the overall picture.

The picture can be locked in a 4:3 (width:height) ratio or free to be *squashed* into whatever dimensions the display window is currently set at.

Unlike other video digitisers I have seen in the past, the picture displayed is actually real-time and is in fact, surprisingly clear. Part of the secret is the presence of some clever hardware on the Eagle M2 that allows pictures to be displayed using dithering, without the need for special programming. The rest, is some particularly cunning and fast programming.

Not even the fastest Archimedes is yet capable of showing a full-screen picture, updated 50 times a second. The rate of update depends on the size of the display window and speeds up or slows down depending on whether you shrink or enlarge it.

As a rough guide, a window about one fifth the size of the desktop will allow an update speed of around 50 frames a second on a 25MHz A5000 in Mode 28.

On a standard machine, pictures can be displayed in either 16 colour or 256 colour modes, but the best way of viewing them is to install a graphics accelerator card and use one of the 15-bits per pixel modes.

The quality in these modes is incredible and it's difficult to remember that you're looking at an image that's being digitised. On the new Risc PC600, the results are even better, particularly when the computer is fitted with Vram.

The method used for displaying the picture means that some time is taken to check if the display window is obscured and this in turn actually slows down the process of updating the screen.

A short Basic program is all that is

PRODUCT SPOTLIGHT

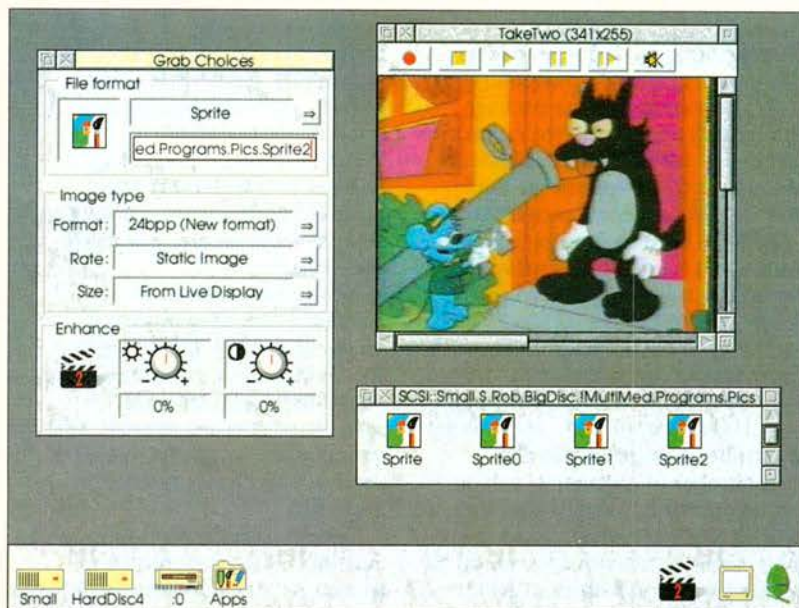
Product: Eagle M2 Multimedia card

Price: £290 (inc VAT)

Suppliers: Computer Concepts,
Gaddesden Place, Hemel
Hempstead, Herts HP2 6EX.
Tel: 0442 63933

● The *TakeTwo* Control window





● Specifying the destination for an image grab

needed to produce a full-screen image that can be displayed outside the desktop environment. This is also faster than the desktop update, making full-screen viewing possible and quite satisfactory.

Still grabbing

A digitiser is not much use unless you can store the grabbed picture and TakeTwo provides three still image formats as well as supporting Acorn's Replay system.

8bpp, 15bpp and 24bpp sprites are all catered for as well as 24bpp Clear files which provide a raw 24bpp image that can easily be converted into other formats.

Both 15bpp and 24bpp TIFF files are supported making it simple to grab images on an Acorn computer and then transfer them across to a PC or Apple Macintosh easily.

Before grabbing any video pictures, a destination needs to be specified by dragging a file icon to a suitable Filer window.

All four types of file are grabbed by selecting a destination on a hard disk and then clicking on Record when the desired image is shown in the live display window.

In the case of Replay files, recording is started with Record and stopped with Stop.

Making movies

To the end-user a Replay file is just that. Unless you've had experience of actually creating them yourself,

you're unlikely to be aware that there are a number of different formats possible under the Replay file banner.

If, like me, you're one of those people who likes to have a look inside applications to see what's going on – remember to back up any application BEFORE you go accidentally changing things – you'll probably have noticed a directory inside the ARMovie directory called MovingLine. This holds a number of files which are tables used to define the different formats.

These directories hold different tables, each relating to a different compression technique. TakeTwo caters for three different (four if you have the Eidos ESCaPe software) picture formats and four different sound formats, and will allow you to create films using any combination.

There are a number of reasons for having different internal Replay formats and it really depends on the type of image you are attempting to store, as to which one you choose.

A cartoon, for example will have large areas of similar colour and you are likely to get away with a lower-quality format as the frame rate needn't be as high as a live moving image.

The quality of the sound in a Replay file varies from mute to 16-bit sound similar to that produced from a CD player – the Eagle M2 can sample sound up

to 12-bit resolution.

Again, some formats will be better suited for a particular type of sound. Speech, for example, requires a much smaller frequency range than music and will therefore record perfectly clearly at a lower resolution.

Recording a film sequence is simple, as long as you have a nice, large chunk of free space on your hard disk.

If you do not have a hard drive fitted you'll be unable to make use of any the Eagle M2's Replay recording features. A floppy disk-only system is too slow and too small for recording anything worthy of being called a film.

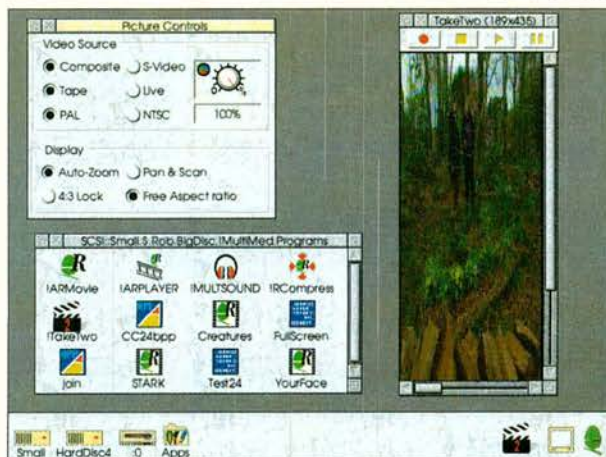
In the Eagle manual, there are also a few other points mentioned that should be noted. If you want to record Replay movies at 25fps you're going to need either an A5000, A540, Risc PC or a fast, customised machine – one fitted with an ARM3 upgrade.

A fast hard disk is also necessary. An IDE or SCSI drive should be adequate but an old ST506 drive fitted in old machines will not be quick enough.

When using a VCR, the Live Display window makes it easy to pinpoint the section of video you require. When you've found the sequence you want to record, and decided on a suitable Replay file format, recording is just a case of clicking on the Record icon to start the process and the Stop icon to end it. The Replay file is stored wherever you specified in the Grab Choices window.

During the recording process, the image in the display window changes to black and white and is only updated

➤ A squashed video picture





occasionally to indicate at where the film is up to, so it's quite tricky to grab a precise chunk of film. As long as you have chosen an uncompressed Replay format, you can edit the film at a later date. You will of course though, require additional software such as Uniqueway's *Empire* Replay movie editor.

Compressing video

Due to the amount of information being processed when recording a Replay film, TakeTwo uses an uncompressed format as standard to store the video sequence.

It is possible to record and compress Replay films in real-time although the quality attainable is not as good. Uncompressed Replay files take up a lot of space but can be squashed afterwards using special film compression software.

ESCaPe is a special utility – currently included free with the Eagle M2 – that allows real-time film recording and compression. Its advantages over the other *formats* are that it requires less memory to grab a movie and also films grabbed using it take up less space on a hard disk.

Due to the sheer amount of work that ESCaPe has to do, it can only cope with films recorded at 12.5 frames per second, while the uncompressed formats can support films at 25 frames per second.

Compressing an uncompressed Replay file is quite an arduous job and the fact that ESCaPe can manage it in real time is a credit to

its programmers, Eidos, as well as the power of Acorn's computers.

RCompress is another package and acts as a front-end for Acorn's Differ and Join programs. There are two stages to compressing a Replay movie and hence two programs.

Differ is used to squash each individual frame down and works by noting the changes from one frame to another.

This type of compression is known as Delta compression. Join then takes these compressed frames – each is a separate file – and merges them into a single Replay file.

A number of parameters can be set before compressing a film that will affect the finished product. A film might be intended to run on all sorts of Acorn machines – ARM2, ARM3, ARM250 and ARM610 powered – so RCompress can be configured to take account of this. A list of options give control over such things as ARM2 compatibility and data rate.

Compressing a film using Differ takes some considerable time, so be prepared to leave your computer on over night if you want to create a long film.

The process is simple and the Eagle M2 manual gives clear instructions for the non-technical. Join is similarly easy to use but takes a considerably shorter time to process the movie frames.

Although some quality is lost when compressing a film, the overall result is pretty amazing considering that the film making process – apart from actually grabbing the video – is software based. There are a few *hardware* video systems for the PC and Apple Macintosh but nothing comes close to Replay.

Film show

Grabbed Replay films, or any Replay film for that matter, can be played back via TakeTwo using the VCR control icons. A copy of Acorn's ArPlayer and MultiSound, both of which are standalone, are also included with the Eagle to allow playback of Replay films and Replay soundtracks respectively.

Black and white

As well as grabbing full colour, 24bpp pictures, the Eagle M2 can be used as a high quality, grey-scale

digitiser. If you are preparing pictures for applications such as DTP, grey-scale images can often be more suitable for the design. Printing colour images in black and white can often lose detail that would otherwise be kept if the picture was a grey-scale image.

A separate application, Scanlight Plus, is used to grab greyscale images. This is exactly the same program as that supplied with Computer Concepts' scanners and Hawk digitiser, but now contains a special driver module specifically written for the Eagle M2.

TakeTwo can be run alongside Scanlight Plus to monitor the income of any video source. When you see the picture you want in the TakeTwo preview window, a single click of the mouse in Scanlight Plus will grab the required image. It couldn't be simpler.

In addition to grabbing images, Scanlight Plus contains a collection of tools for processing grey-scale pictures. Needless to say, the results are very good and are even comparable to pictures grabbed with a normal hand scanner.

Features of Scanlight include the ability to flip, crop or scale an image. A further Toolbox window allows rotation and image enhancement tools, as well as a selection of image enhancement options such as sharpen, blur, noise removal and edge detection.

Using these tools it is possible to *clean up* pictures that may have been grabbed from a video signal with interference. Special effects such as shadowing and negatives can also be achieved.

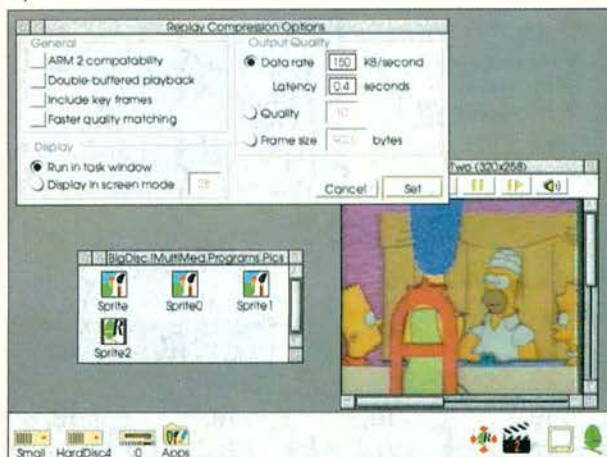
Sounds all right

Sound is a further part of multimedia, and the Eagle M2 offers a whole collection of facilities to grab, manipulate and playback sounds.

AudioWorks is a single application that allows sound to be sampled at up to 12-bit resolution through the Eagle M2 card. It provides a set of tools for editing sounds as well as special effects for things such as stereo-panning and pitch bending.

Perhaps the most interesting

● The RCompress Options window



feature of the Eagle M2 card, sound-wise at least, is the fact that it can be used to play any sounds held in the computer at up to 12-bit resolution – this feature is only available with computers fitted with an ARM3 (or greater) processor such as A540, A5000 and Risc PC.

Special software in rom patches in the Eagle's sound system to that of the host computer, effectively making it transparent to the user.

Any package that uses sound on the Archimedes is automatically enhanced by the increase in quality, and packages such as Oregon's Digital Symphony especially benefit. Full stereo playback is possible and given that you have the Eagle M2 linked up to a suitable amplifier, the quality attainable is superb.

External sound can even be mixed with sound generated by the computer, effectively turning the Archimedes into an – albeit lowish quality – audio mixer.

One particular use for the sound mixing is that you can channel the sound from a CD-Rom, as most drives have two phono sockets on the back, through the Eagle M2 card and out through the Archimedes speaker, or through the Eagle M2 to an external amplifier for better quality.

Although I wouldn't think of buying the Eagle M2 just for the sound quality improvement, it is certainly one its most attractive features. Wild Vision's soon-to-be-released Lark card works much along the same lines as the Eagle's sound section, although it is capable of higher quality sampling and playback.

Midi control

Although the Archimedes is not really regarded as a music-making computer, Computer Concepts have included a Midi interface as standard on the Eagle M2 card.

The interface conforms fully to the same specification used by Acorn's – now discontinued – Midi expansion card and so should work with any software designed for that.

I tried a number of Midi packages including Clares' Rhythm Box and Serenade packages, both of which worked as expected. The Midi interface offers IN, THRU and OUT sockets, via a ponytail connector (included with the package) that

● ArMovie displaying a Replay film



links to the back of the Eagle M2.

These provide all the necessary connections for connecting up any piece of music equipment fitted with standard Midi sockets.

Summing up

It's all very well having a product that appears to do everything but who do you aim it at? With Computer Concepts' already established presence in the desktop publishing market, I can see a lot of people using the Eagle M2 to grab high-quality colour and greyscale pictures.

With a good video source, the results can be as good as pictures grabbed with conventional scanners. Even with the addition of a VCR or video camera, the Eagle M2 works out cheaper than a good, flatbed colour scanner.

The sound sampling features are currently some of the best available on Acorn machines, and, added to the Eagle's ability to actually improve the sound output of the Arc, make them a particularly desirable feature of the card. I can't see anyone buying the card just for the Midi interface alone, but it certainly adds to the overall usefulness of the hardware.

The software included all comes up to standard and compliments the hardware perfectly. There are still a few changes I could suggest, but then, no piece of software is perfect.

Computer Concepts' policy of upgrades for registered users should make sure that the current software continues to develop as user feedback decrees.

The equivalent products on their own

– GreyHawk digitiser, Hawk V9 digitiser, Lark sound card sampling and replaying audio at 16 bit resolution rather than 12-bit like the Eagle M2 and Midi Max Midi card – would cost roughly £665. You also get the full AudioWorks package which would cost an additional £57.57.

Looked at like this, the Eagle M2 – at half the price – is really excellent value for money. It also takes up only one expansion slot as opposed to four.

Future development is promised both in software and hardware, and the next Eagle-related product has already been announced.

This is called the Chroma 500 digital genlock board and allows you to overlay computer graphics on video. The two boards are linked together by means of the Talon interface already present on the Eagle M2 board.

Future expansion cards expected to make use of this feature include hardware video compression and other special effects. The Eagle M2 is therefore not just one product, but the platform for a whole collection of different video cards and accessories.

The Eagle M2 is the only all-in-one multimedia solution for Acorn machines at present and is the answer to any DIY movie buff's dreams. If you want to join the world of multimedia production, it really is an essential purchase.

Glossary

Vram – Video Random Access Memory. A special area of fast memory used to store the screen memory. Vram allows for faster screen updating and hence, increases the *usability* of the computer by reducing the overhead on the main processor.

BPP – Bits per pixel. This term refers to the number of bits used to store a single pixel. The number of colours available can be determined with the following equation: 2^x , where x is the number of bits per pixel. So 24bpp is 2^{24} or 16,777,216 colours.

Watford Electronics

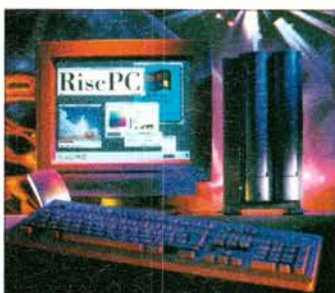
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RiscPC



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The standard sound system offers 8 stereo channels, which can be upgraded with the optional 16-bit sound card. Networking options include Econet, Acorn Access and Industry standard Ethernet. There is also a choice of either 14" or 17" monitors.

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- 2nd processor slot
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(above prices apply at time of purchase of RiscPC system)

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ADA 0580	340Mb	16mS	£289
ADA 2030	420Mb	13mS	£399

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ADA 0730	120Mb	16mS	£199
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ADA 2090	340Mb	13mS	£479

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ADA 2090	340Mb	13mS	£469

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ADA 2180	420Mb	13mS	£439

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Archi Hand Scanner

Watford's MKII Hand Scanner for the Archimedes and A3000 has a maximum resolution of 400dpi, and a scan width of 4". Features include: cropping and scaling images, X flip and Y flip, and edge detection.

- A300/A400/A5000 version **£89**
- A3000 external version **£109**
- v1.10 ROM Upgrade **£20**

Upgrade to A4 Scanner

For existing users of the Watford MK2 Hand Scanner we can offer you an upgrade to the A4 Scanner for only **£129**

Archi A4 Scanner



The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, etc, with its detachable sheet feeder, or used as an A4 wide hand scanner. 64 grey levels are produced from the scanner at resolutions up to 400dpi.

- A4 Scanner for A300/A400 **£199**
- A4 Scanner for A3000 **£229**
- Sheet Feeder for A4 Scanner **£69**

Disc Controllers

- External Floppy Disc Interface **£10**
- Backplate/Lead for above **£9**
- 8-bit SCSI card **£129**
- 16-bit SCSI card **£149**
- 16-bit SCSI card - 16Kb cache **£169**
- 16-bit SCSI card - Acorn **£249**
- ST506 Hard Disc podule **£49**
- 16-bit IDE interface - A300/A400 **£59**
- 8-bit IDE interface - A3000 internal **£89**

Graphics Cards

- Colour Card Gold **£239**
- Chroma 500 Genlock card **£419**
- Chroma 150 PAL Encoder **£169**
- Chroma Genlock card **£209**
- Hawk V9 MKII Digitiser **£189**
- Eagle M2 Multimedia card **£319**
- Vision Colour Digitiser **£99**
- HiVision Colour Digitiser **£149**

Archi Mk4 Mouse

The new Mk4 mouse for your Archimedes is the ideal replacement for your old worn out Acorn mouse. The sleek design makes the mouse a pleasure to handle, and it also looks nice on your desktop.

only £24

ArcLaser Printers

This range of direct-drive laser printers for the Archimedes gives excellent high speed printing. Models available range from 300dpi A4 size to 1200dpi A3 size.

- ArcLaser A4 1200dpi **£985**
- ArcLaser A3 1200dpi **£4995**

Scanners

- Scanlight 256 - A300/400 **£188**
- Scanlight 256 - A3000 **£198**
- Scanlight Professional **£549**
- Scanlight Video 256 **£199**

Networking

- Econet Interface - all models **£49**
- Ethernet Interface III - A5000 **£149**
- Ethernet interface - RiscPC **£99**
- Acorn Access - A3000 **£145**
- Acorn Access - A3020 **£145**
- Acorn Access - A5000 **£145**
- Acorn Access - RiscPC **£119**
- Accord P/P Networking - A3000 **£145**
- Accord P/P Networking - A3020 **£149**
- Accord P/P Networking - A5000 **£145**
- EtherLAN Card - A3000 (BNC) **£131**
- EtherLAN Card - A3020 (BNC) **£143**
- EtherLAN Card - A5000 (BNC) **£131**
- EtherLAN Card - A3000 (BNC/TP) **£131**
- EtherLAN Card - A3020 (BNC/TP) **£148**
- EtherLAN Card - A5000 (BNC/TP) **£131**
- EtherLAN Card - RiscPC (BNC/TP) **£113**
- 12 port UTP Ethernet Hub **£299**

Ethernet Cabling

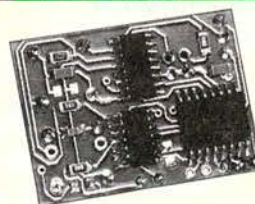
Length	Thinnet	Twisted Pair
1m	£2.50	£2.00
3m	£4.50	£2.75
5m	£6.50	£3.25
10m	£9.50	£5.25

Fax/Modem Bundle

Now you can use your Archimedes computer as a fax machine. Prepare a fax, send it using the ArcFax software. Receiving a fax is simple - display on the screen or print out on any RISC OS printer.

- Fax/Modem with ArcFax software **£149**

VIDC Enhancer



The Watford VIDC Enhancer for the Archimedes 300/400 and A3000 computers, caters for all types of Multiscan and VGA monitors.

- Multiscan VIDC Enhancer **£15**
- SuperVGA VIDC Enhancer **£29**

CD-ROM Drives



Aries CD-ROM Drive for RiscPC

The ideal CD-ROM drive for the RiscPC. The drive is available with or without 16-bit SCSI card, and can be installed in a matter of minutes.

- Aries CD-ROM Upgrade for Risc PC **£275**
- Aries CD-ROM drive only **£145**

Cumana CD-ROM Drives

Enter the world of Multimedia on this Arc with the Cumana range of CD-ROM drives and accessories.

- 300 Series - low cost drive**
- 300 CD-ROM Drive/Interface **£339**
 - 300 CD-ROM Pack 1 **£424**
 - 300 CD-ROM Pack 2 **£509**

- 600 Series - SCSI drive**
- 600 CD-ROM Drive/Interface **£509**
 - 600 CD-ROM Pack 3 **£594**
 - 600 CD-ROM Pack 4 **£680**
- CD-ROM Packs include Drive, Interface, Cables, Stereo Speakers and some CDs

Pioneer CD-ROM Drives

A new range of SCSI CD-ROM drives which accept 8 discs at the same time.

- DRM502X Dual Speed CD drive **£499**
- DRM504X Quad Speed CD drive **£999**

Acorn Multimedia Expansion

Styled to match the A4000 and A5000 this unit will fit neatly on top.

- Multimedia Expansion **£485**
- Multimedia Expansion - 16bit **£685**
- Multimedia Expansion - 8bit **£585**

HCCS Ultimate CD-ROM Drive

A dual speed CD-ROM drive supplied complete with Interface.

- Ultimate CD-ROM for A300/A400 **£289**
- Ultimate CD-ROM for A3000 **£289**
- Ultimate CD-ROM for Ultimate Exp **£289**

CD-ROM Software

- Artworks **£129**
- Artworks Clip Art **£18**
- British Birds **£150**
- Castles **£40**
- Countries of the World **£40**
- CD - 4 Disc Set **£149**
- CD Francais **£120**
- Creepy Crawlies **£90**
- Dictionary of Living World **£175**
- Dinosaurs **£124**
- Frontier 2000CD **£125**
- Grooves **£90**
- Hutchinson Encyclopedia **£49**
- Illustrated Holy Bible **£23**
- Illustrated Shakespeare **£23**
- Image Warehouse **£53**
- Revelation II **£99**
- Sherlock Holmes **£23**
- Space Encyclopedia **£57**
- Really Useful CD v1 **£47**
- Really Useful CD v2 **£47**
- Times & Sunday Times **£195**
- Tekkie CD **£99**
- Pro Artisan v2 **£129**

Archi Accessories

- A3000/A3010 Keyboard Dustcover **£5**
- A3000 Combined Dustcover **£9**
- A3000/400 Dustcover **£9**
- Archi Keyboard only Dustcover **£5**
- A5000 Dustcover **£9**
- 14" Monitor Dustcover **£6**
- Perspex Keyboard Cover **£8**
- A3000 Monitor Stand (WE) **£15**
- A3000 Podule Case **£15**
- A3000 Carry Case **£10**
- A4 Notebook Carry Case **£35**
- A4 Notebook Battery Pack **£49**
- Archi Keyboard Extension Lead **£8**
- Quest Trackerball **£25**
- Voltmace Delta Cat Joystick **£25**

Imagine.....



Aries

A 2400dpi* colour flatbed scanner for the Archimedes or RiscPC for under £800. With true colour capabilities (16.7 million), we are sure you'll agree that it's an offer you can't afford to ignore.

Having brought you the most innovative handscanner back in 1992, we thought it was time to do it again. Following their success in the PC field, we introduce the award winning Aries Relisys flatbed scanners for the Acorn Archimedes and RiscPC. When you see the remarkably affordable price, you'll be sure to want one.

With the Aries Relisys scanner you'll open up a whole new world of possibilities. Imagine being able to scan a whole A4 size picture and in true colour. If you don't want the whole image, simply select the required area and scan again - the software will capture only what you want to see.

The Aries Relisys scanner is the perfect answer for anyone involved in desktop publishing (DTP) work that requires the ability to import graphic images easily, or import text via Optical Character Recognition (OCR) software.

With the firmware interpolation they produce outstanding quality scans (up to 2400dpi*) and either 256 greyscales or 16.7 million colours.

The scanners are amazingly fast too. With a standard SCSI II interface**, they can scan a whole A5 page in 15 seconds (mono) and in minutes (24-bit colour).

An optional 50 page document feeder is available for scanning long documents, and an adaptor to get the best results when scanning transparencies.

* Resolution quoted is the maximum achievable using interpolation.

** SCSI controller required.



ISO-9001
Manufactured to BSI
Quality Standard
Certificate

FREE Software

All Aries Relisys scanners come supplied with connecting cable, TWAIN driver and a copy of ImageMaster scanning software.

Software Features:

- Scan size not limited to RAM - images are saved directly to hard disc.
- Industry standard files supported - TIFF, JPEG, PCX, PBM, BMP, GIF and Sprite.
- TWAIN compliant.
- Scan type selectable from monochrome up to 16.7 million colours (24bpp).
- Advanced image processing tools/filters.
- Edit, rotate, shear, crop & flip images.
- Alter colour resolution of scanned image.

Scan256 Pro - 256 Greyscale A4 Scanner

- Single pass 256 greyscale scanner
- 8.5" x 14" scanning area
- 2400dpi x 2400dpi maximum scan resolution*
- 256 brightness/contrast settings
- SCSI II interface

Introductory Offer Price

£499

ScanColour Pro - Colour A4 Scanner

- Single pass 16.7 million colour scanner
- 8.5" x 14" scanning area
- 2400dpi x 2400dpi maximum scan resolution*
- 256 brightness/contrast settings
- SCSI II interface

Introductory Offer Price

£799

Optional Accessories:

EcoSCSI Interface	£35
16-bit SCSI Interface	£129
Document Feeder	£259
Transparency Adaptor	£295
Sleuth OCR software	£43

Educational Discounts

Please call 0582 745555 for details

TO ORDER CALL OUR SALES HOTLINE **0582 745555**



Archimedes Software

Desktop Publishing

• Impression Publisher £109

Impression Publisher

Impression Publisher is the latest version of the highly acclaimed document processing software for the Archimedes and RiscPC. Publisher can be your work processor. It is also excellent at handling large documents, even books. It's ideal for producing adverts, brochures and the most complex page layout tasks, and at a remarkable price.

Special Offer Price £109

• Impression Publisher OPI £159
• Impression Style £69
• Impression II Business Supplement £29
• Impression II Borders Disc £10
• Ovation £79

DTP Utilities

• CC Graphics Loaders £35
• Desktop Thesaurus £15
• Equator £32
• Spellmaster £25
• Sleuth OCR £43
• Type Studio £35
• Optical OCR £POA

Word Processors

• DeskEdit 3 £21
• Data Word £14
• Easiwriter 3 £115
• Easiword Plus £38
• Pendown £45
• Pendown Plus £65
• Pendown Etolles £45
• Primeword £42
• Wordz £75

Spreadsheets

• Advantage £39
• Eureka £92
• ProSheet £28
• Resultz £87
• Schema 2 £95

Databases

• Flexifile £18
• Genesis Project £49
• Genesis Professional £119
• Insight £57
• Knowledge Organiser 2 £70
• Masterfile 3 £39
• Multistore v2 £78
• Pinpoint 2 £82
• Junior Pinpoint £24
• Pinpoint Datafiles £
• Recordz TBA
• S-Base Personal v2 £99
• S-Base Developer v2 £189

Integrated Packages

• Advance £79
• Desktop Office £48
• Pipedream 3 £69
• Pipedream 4 £90
• Fireworks £124

Languages

• Desktop Assembler £99
• Desktop C £151
• PC Bolt £89
• Control Logo £21
• Easy C £43
• Logotron Logo £57
• Risc BASIC Compiler v9.0 £59
• Risc FORTH Compiler £59
• Robo Logo v1.1 £29

Site Licences

• Advance Primary Licence £181
• Advance Secondary Licence £440
• Artworks £540
• Impression Style £495
• Impression Publisher £540
• Pinpoint 2 £79
• Pipedream 4 £695

Communications

• ArcTerm 7 £58
• Hearsay 2 £59
• Arc Fax £34

Graphics

• Artisan 2 £43
• Autosketch II £89
• ArcTist £15
• Ateller £23
• Artworks £99
• Chartwell £22
• Craftshop 1 £18
• Craftshop 2 £18
• Euclid 2 £58
• Film Maker v5.1 £47
• GraphBox £36
• GraphBox Professional £65
• Illusionist £37
• Image Animator £58
• Kid Pix £32
• Plot £59
• Poster £63
• Presenter GTI £55
• PrimeArt £42
• Pro Artisan 2 £95
• ProArt 24 £125

ProArt 24

ProArt is the latest addition to Clares' range of graphics packages. Written for the RiscPC, this powerful software takes advantage of the machines 24-bit colour capabilities and more.

Special Offer Price £125

• Render Bender 2 £37
• Rephorm £42
• Revelation 2 £69
• Revelation Image Pro £99
• Solids Render v5.1 £59
• Tiller £105

CAD

• Arc PCB v1.8 £72
• Arc PCB Schematics v3.2 £151
• Arc PCB Professional v5.1 £203
• CADET £95
• SolidCAD v5.1 £62
• SolidTools v5.1 £154
• PowerRouter £43
• Excellon Drill £43
• Oak Parametric Design Tool £149
• WordCAD £59

Business

• Business Accounts System £259
• Business Account Modules £79
• Payroll Manager v2.0 £59
• Prophet Accounts £129
• Personal Accounts £
• Home Accounts £24
• Financial Accountant £175
• Shareholder Professional £115
• Micro Trader System £275
• Micro Trader Modules £75
• PlanING £95
• ProjectING £289

Music & Speech

• Rhapsody 2 £45
• Rhapsody 3 £72
• Notate £59
• ArcTiculate £17
• Armadeus £59
• Vox Box £45
• Score Draw £45
• AudioWorks £30
• Speech! £18

Printer Drivers

• Expression PS £18
• Star/Citizen Colour Driver - OS 2 £10
• DeskJet Colour Driver £10
• Epson JX Colour Driver - OS 2 £10
• iPrinters v1.22 Upgrade - OS 3 only £5
• Canon BJ/BJC600 TurboDriver £39
• HP DeskJet/Laser Jet Turbo Driver £39
• Epson Stylus TurboDriver £39
• Show Page £139
• Repro £42
• SuperPlot £10
• SuperDump £10

Networking

• AUN/Level 4 Fileserver Rel. 8 £859
• TCP/IP Protocol Suite - Single User £99
• TCP/IP Protocol Suite - Site Licence £399

Games

• Adventures of Sylvia Lane £18
• Air Supremacy £13
• Black Angel £22
• Break 147 & Superproof £22
• Birds of War £22
• Battle Chess £17
• Cyber Chess £18
• Carnage inc. £15
• Crystal Maze £24
• Chess 3D £18
• Chocks Away Compendium £18
• Chuck Rock £14
• Cycloids £14
• Diggers £18
• Dungeon £16
• E-Type Compendium £15
• Elite £29
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• Lemmings £14
• Lemmings 2 - Tribes £18
• Lotus Turbo Challenge II £16
• Magic Pockets £17
• Manchester United £8
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• Nebulus £14
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• Real McCoy 3 £20
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• Repton 3 £13
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• Sensible Soccer £13
• Sim City £15
• Stunt Racer 2000 £18
• SWIV £8
• Technodream £18
• Virtual Golf £18
• Warlocks £22
• Xenon 2 £17
• Zool £15

Miscellaneous

• Investigator 3 £43
• DFS Reader £5
• Compression £32
• Gerber Plot £43
• Touchtype £39
• Hard Disc Companion 2 £39
• Oak Logic £69
• Ancestry £42
• Time Tabler £469
• RISC OS 2 SID Utilities Discs £10
• Concept Keyboard Designer £20
• File Handling for All Disc £4
• WIMP Programming for All Disc £4
• ImageMaster Scanner software £30
• Time Tabler £469

CLEARANCE OFFERS

We have a number of software titles on offer, at £15.00 each, while stocks last. Please call for availability.

- Acorn Desktop Publisher
- First Word Plus Rel. 2
- Clares Graphic Writer
- Desktop Folio DTP
- Investigator II
- PC Emulator v1.7
- Genesis Plus

Educational

• 10 out of 10 English £15
• 10 out of 10 French £15
• 10 out of 10 Dinosaurs £15
• 10 out of 10 Driving Test £15
• 10 out of 10 Number £15
• 10 out of 10 Statistics £15
• 10 out of 10 Algebra £15
• 10 out of 10 Early Essentials £15
• 10 out of 10 Junior Essentials £15
• 10 out of 10 Structured Spelling £15
• Arcventure I - Romans £24
• Arcventure II - Egyptians £24
• Arcventure III - Vikings £24
• Arcventure I, II & III Bundle £68
• Around the World in 80 Days £29
• An Eye for Spelling £31
• Animated Alphabet £16
• Animated Numbers £16
• Aztecs £32
• Badger Trails £32
• Best Four Adventure £31
• Best Four Language £31
• Best Four Maths £31
• Bookstore - Primary £33
• Bookstore - Secondary £52
• Britain since 1930 £29
• Bumper Disc 1 £16
• Bumper Disc 2 £16
• Crystal Rain Forest £31
• Dream Time £16
• Export, Trade and Industry £34
• Farm £15
• Fun School 3 RED - Under 5s £15
• Fun School 3 GREEN - 5 to 7s £15
• Fun School 3 BLUE - Over 7s £15
• Fun School 4 RED - Under 5s £15
• Fun School 4 BLUE - Over 7s £15
• Fleet Street Phantom £22
• Geordie Racer - Look & Read £21
• House of Numbers £20
• Investigating Maths £32
• Landmarks - World War II £21
• Landmarks - Egypt £21
• Landmarks - Rainforest £21
• Landmarks - Victorians £21
• Landmarks - Columbus £21
• Landmarks - Aztecs £21
• Landmarks - Civil War £21
• Landmarks - Elizabeth I £21
• Linkword - French £32
• Linkword - German £32
• Linkword - Spanish £32
• Maggie 2 £49
• Mapventure £22
• Nature Park Adventure £22
• Naughty Stories Vol.1 £37
• Naughty Stories Vol.2 £37
• Numerator £32
• Numerator Chaos Pack £18
• Podd £23
• Recall £32
• Sea Rescue £22
• Selladore Tales £18
• Sky Hunter - Look & Read £21
• Stig of the Dump £18
• Space City £22
• Space Mission Mada £22
• Through Dragon's Eye - Look & Read £21
• Topographer £59
• Viewpoints £29
• Wizards Revenge £15
• Worst Witch £18

Books

• Archimedes Assembly Language £12
• Acorn to PC £5
• Archi Game Makers Manual £14
• Artworks Made Easy £12
• ARM Technical Data Manual £10
• Ansi C Rel 4 User Guide £25
• BBC BASIC Reference Guide £15
• C: A Dabhand Guide 3rd Edition £15
• Control on the Archimedes £10
• First Impressions £20
• File Handling for All £10
• Good Impressions £12
• Impression II - A Dabhand Guide £12
• Mastering First Word Plus £12
• RISC OS 3 Programmer's Ref. Man. £35
• RISC OS 3 First Steps £12
• WIMP Programming for All £10
• A3000 Technical Manual £28
• A5000 Technical Manual £59
• A4 Notebook Technical Manual £59
• A3010/A4000 Technical Manual £29
• RiscPC 600 Technical Manual £POA
• RiscPC OS Style Guide £10

Laser Printers

All Laser printers (excluding Hewlett Packard)
include 12 Months On-Site maintenance

• Brother HL-6	6ppm	£422
• Brother HL-6V	6ppm	£463
• Canon LBP-4U	4ppm	£478
• Canon LBP 4i	4ppm	£480
• Canon LBP-8 IV	8ppm	£920
• Canon LBP-8 IIR	8ppm	£1559
• Epson EPL-5200	6ppm	£480
• Epson EPL-5600	6ppm	£660
• Epson EPL-7500 PS	6ppm	£1135
• Fujitsu VM600	6ppm	£529
• Fujitsu VM4	4ppm	£499
• HP LaserJet 4L	4ppm	£462
• HP LaserJet 4 ML	4ppm	£745
• HP LaserJet 4P	4ppm	£716
• HP LaserJet 4MP	4ppm	£975
• HP LaserJet 4+	12ppm	£947
• HP LaserJet 4M+	12ppm	£1270
• HP LaserJet 4Si	16ppm	£2175
• HP LaserJet 4Si MX	16ppm	£3259
• NEC SuperScript 810	6ppm	£422
• NEC S 102P	6ppm	£992
• OKI OL-400ex	4ppm	£379
• OKI OL-410ex	4ppm	£515
• OKI OL-850 PS	8ppm	£770
• Panasonic KX-P4400	4ppm	£360
• Panasonic KX-P4410*	5ppm	£360
• Panasonic KX-P4430*	5ppm	£496
• Panasonic KX-P4440	10ppm	£775
• Panasonic KX-P5400	4ppm	£599
• Star LS-5	5ppm	£365
• Star LS-5 EX	5ppm	£499
• Star LS-5 TT	5ppm	£530

*2 years on-site warranty

Laser RAM Upgrades

Type	1M	2M	4M	8M
• Canon LBP-4+	£139	-	-	-
• Canon LBP-4i	£109	-	£279	-
• Canon LBP-8 IV	£119	-	£299	-
• EPL-4100/4300	£70	£110	£205	-
• EPL-5200/5800	£58	£115	£215	-
• Fujitsu VM600/VM4	£57	£85	£149	£299
• Fujitsu VM800	£115	-	-	-
• HP III/IIIP/IIID	£75	£115	£135	-
• HP II/II	£75	£115	£135	-
• HP IIISI	£57	£85	£158	£299
• HP 4/4M/4P/4MP	£85	£85	£149	£299
• HP 4L/4ML	£75	-	-	-
• KX-P4410/4430	£129	£199	-	-
• KX-P4420/4450i	£75	£115	£135	-
• KX-P4400/5400	£89	£139	£229	-
• OKI OL400e	£89	£118	-	-
• Star LP-8	£138	£225	-	-
• Star LS-5	£75	-	-	-

Laser Consumables

Type	Toner	Drum	Dev
• Canon/Star 4s	£48	-	-
• Canon LBP-8 IV	£70	-	-
• Canon LBP-8 III	£52	-	-
• Canon LBP-4U	£52	-	-
• EPL-4100/4300	£83	£89	-
• EPL-5200	£85	-	-
• EPL-7500	£177	-	-
• Fujitsu VM600	£85	-	-
• Fujitsu VM800	£115	-	-
• Fujitsu VM4	£29	£149	£89
• HP III/IIID	£52	-	-
• HP III/IIIP	£48	-	-
• HP III/ISI/4Si	£95	-	-
• HP 4/4M/4P/4MP	£70	-	-
• HP 4L/4ML	£45	-	-
• NEC 610	£85	-	-
• NEC S60/S62P	£89	-	-
• OKI OL-400/800	£19	£189	-
• OKI OL-400s	£17	£129	-
• KX-P4410/30	£27	£109	£109
• KX-P4420	£22	£80	£59
• KX-P4450/51/55	£19	£69	£79
• KX-P4400/5400	£32	£69	-
• Qume Crystalprint	£99	£189	-
• Star LS-5	£83	-	-

Laser Accessories

• JetPage Postscript Cartridge - IIP/IIIP	£225
• Postscript Upgrade for LaserJet 4	£270
• LaserJet 4 Lower Paper Cassette	£205
• LaserJet 4 JetDirect Ethernet Card	£339
• LaserJet IIP Lower Paper Cassette	£115
• Ozone filter for KX-P4420	£9
• Ozone filter for KX-P4450/4455	£20
• LaserJet 4Si Duplex Unit	£475
• Envelope Feeder for LaserJet 4	£199
• LaserJet Font Cartridges	from £45
• LaserJet III FX/IBM Emulation Cart.	£79
• Lower Paper Tray for Canon LBP-4	£98
• A5 Paper Feeder for LaserJet 4P	£85
• Postscript Upgrade for LaserJet 4P	£225

9pin Matrix Printers

• Citizen Swift 90	80col	£115
• Citizen Swift 90C	80col	£122
• Citizen 1200+ Parallel	80col	£90
• Citizen 120D+ Serial	80col	£109
• Epson LX100	80col	£109
• Epson LX400	80col	£91
• Epson LX850+	80col	£134
• Epson LX1050	132col	£174
• Epson FX870	80col	£226
• Epson FX1170	132col	£284
• Epson DFX5000C	132col	£1095
• Panasonic KX-P1150	80col	£89
• Panasonic KX-P1695	132col	£287
• Star LC15	132col	£178
• Star LC100C	80col	£89
• Star ZA200	80col	£255
• Star ZA250	132col	£315

24pin Matrix Printers

• Citizen ABC Mono	80col	£115
• Citizen ABC Colour	80col	£135
• Citizen Swift 200 Mono	80col	£138
• Citizen Swift 200 Colour	80col	£146
• Citizen Swift 240 Mono	80col	£185
• Citizen Swift 240 Colour	80col	£165
• Citizen Swift 24X	132col	£235
• Epson LX100	80col	£118
• Epson LX150 Colour	80col	£159
• Epson LX570+	80col	£188
• Epson LX870	80col	£353
• Epson LX1070	132col	£283
• Epson LX1170+	132col	£407
• Epson LX2550	132col	£879
• NEC P20	80col	£134
• NEC P30	132col	£236
• NEC P320	132col	£245
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• NEC P72	132col	£386
• NEC P90	132col	£582
• Panasonic KX-P2023	80col	£109
• Panasonic KX-P2123	80col	£126
• Panasonic KX-P2124	80col	£208
• Panasonic KX-P1624	132col	£210
• Panasonic KX-P2624	132col	£255
• Star LC24-20 II	80col	£113
• Star LC24-15 II	132col	£235
• Star LC24-30C	80col	£148
• Star LC24-100	80col	£95
• Star LC24-300C	80col	£178
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• Canon BJ200/BJ230	£16	-
• Canon BJ300/BJ330	£11	-
• Canon BJC600	£6	£8
• Canon BJC800	£16	£22
• Citizen 120D+	£4	-
• Citizen Swift 200/240	£4	£13
• Citizen Swift 24X	£8	£18
• Epson LX400/LX850/FX870	£4	-
• Epson LX100	£4	-
• Epson LX1050/FX1170	£5	-
• Epson LX100	£4	-
• Epson LX150	£4	£12
• Epson LX570/870	£5	-
• Epson LX1070/1170	£8	-
• Epson LX2550	£8	£16
• Epson SQ870/SQ1170	£23	-
• Epson Stylus 300	£10	-
• Epson Stylus 800/1000	£10	-
• Epson Stylus Colour	£14	£29
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• Fujitsu B100/B200	£14	-
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• HP DeskJet 1200	£22	£26
• HP PaintJet	£17	£27
• HP PaintJet XL300	£17	£19
• Kaga/Taxan KP810/815	£5	-
• NEC P22Q/P32Q	£8	-
• NEC P60/72/P90	£8	£14
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• Star LC200	£5	£12
• Star LC24-20/24-100/24-200	£5	£12
• Star LC24-30	£8	£12
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• Canon BJC300	132col	£372
• Canon BJC600	80col	£410
• Canon BJC800	132col	£1070
• Canon BJC820 (Mac)	132col	£1228
• Citizen Project II	80col	£299
• Epson Stylus 300	80col	£155
• Epson Stylus 800	80col	£177
• Epson Stylus 1000	132col	£340
• Epson SQ870	80col	£415
• Epson SQ1170	80col	£580
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• HP DeskJet 520	80col	£186
• HP DeskJet 500C	80col	£247
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• HP DeskJet 1200C	80col	£1080
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• HP PaintJet XL300 PS	132col	£2575
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AGENDA

- Monitor prices
- 32-bit Spectrum access
- Printing errors
- Using joypads
- Replacing buffers
- Building printer cables
- Electron data loggers

Q I AM just about to buy a Risc PC and on looking at prices of 17in monitors I have noticed that the Acorn-badged AKF85 is £989 while an Aries 7000 17in monitor is less than £600. Why?

Surely it would be better and cheaper to buy another make of monitor rather than an Acorn-badged one with my Risc PC. How about a Taxan 875+. Would I be justified in saving at least £200?

Daniel Barron, Hull

A You are always justified in saving money but don't forget the maxim that you get what you pay for. On the face of it the two monitors sound the same. However, a close look at the specifications reveals that there are differences.

For instance, the phosphor dot pitch is 0.28 on the Aries and 0.27 on the AKF85 – this means the display won't be as crisp. Secondly, the cheaper monitor will only lock on to line rates up to 65KHz as opposed to 83KHz for Acorn's monitor.

This reduces the number of screen modes that will be available. Also, it seems that the Aries has a frame rate of only 60Hz as opposed to the maximum

Monitoring your display

of 120Hz, which can mean a slight flicker.

Finally the AKF85 has a built-in mode memory that adjusts the monitor's controls to give you a consistent display over many different modes.

However, having said all that, I am only going off the printed specification. The real judge is to look at the two monitors side by side. I am all for saving money but most bargains come with strings attached.

Background printing

Q I AM experiencing trouble with my printer. Sometimes when I print I get an error message Disk Full (Print cancelled) when I am running the drivers from floppy disk.

Could you please explain why this happens as I don't see why it has to write to disk when printing. I am using an A3000 with RISC OS 3.11 and the FX-80 drivers.

Tim Carpenter, Hornchurch, Essex

A Printing used to be such a simple process. The computer sent bytes to the printer and everything else stopped. Nowadays, in order to handle the vast numbers of different printers, printer drivers act as intermediate translators which means that sometimes they need to write to disk.

This happens for example if you have background printing enabled. The printer driver sends all the data on to disk quickly and then recovers it a small chunk at a time to feed to the printer. This allows you to get on with other work while one or more documents are being printed.

The place where all this storage takes place is the Scrap directory and the operating system will use the first one it sees after power up. If there is no room on that disk you will be sent an error message.

So how can you minimise the disk storage requirements? First of all you can disable background printing that

Another look at your problems with solutions from Mike Cook

will remove most of the need for disk access.

If you have a hard drive make sure the Scrap directory is at the top level. If you are running from floppies have a disk with just Scrap on it and double-click this from the desktop before you put any other disk with Scrap in the machine.

Plum buffered out

Q I WRITE with a problem which is affecting my Master 128. Although I have now changed to the more powerful Archimedes, the trusty old BBC still has a place on my desk.

It would appear from interrogating my son that an EMR Midi interface was connected to the disk drive socket and the user port instead of the 1MHz Bus and user port.

I think that this has resulted in the disk drive functioning but the LED indicator is constantly on, the parallel printer port also seems to have stopped functioning and all that is printed now is a garbled mess of unrecognisable text.

Once it has been turned on from cold it seems to work fine apart from these faults. However, if it is then turned off it refuses to restart until it has cooled down.

I do not profess to be an electrical repair technician but I have access to basic test equipment and would be able to carry out minor

Spectrum analysis

Q IN response to a letter regarding a Spectrum emulator for the Archimedes, there is in fact one available for downloading on HENSA. This is called !MZX and is a PD application by ARM Unlimited and though only as powerful as similar PC versions, it is still quite acceptable.

It requires Spectrum Snapshot files to run anything. The package, complete with instructions and a Spectrum keymap as a draw file is available from HENSA on uk.ac.hensa.micros for those lucky enough to have Internet access.

William Kay, Rastrick, Yorkshire

A Well, I am absolutely amazed that anyone should ever want to do this, let alone put in the effort of doing it. I have tried it and found the system ran at an unusable slow speed on Mode 21 on an ARM3 A310.

Switching to Mode 12 speeded things up considerably and it felt like I was running through treacle. However, this is when running the emulator in a wimp window, there is a single tasking mode which does run at an acceptable speed. There is even an option to slow it down.

I am not quite sure on the legality of snapshots. These appear to be the memory dumps of commercial games for which the copyright still holds.

This is so new that it has even been tested on a Risc PC. Unfortunately, the single tasking mode crashed on that. Nevertheless, this is available to any who wants it.

repair tasks such as replacing semiconductors.

D. Redhead, Sholing, Southampton

A It sounds like you have blown a few buffers which should be quite simple to replace. The disk drive light being on is probably IC1 the 7406 buffer. The head load signal being permanently on is, in itself, no problem if you only have one disk drive.

But as the head is permanently against the media as the motor stops and starts again, this could cause excessive disk wear and maybe eventually damage.

The printer producing rubbish is caused by one of the buffers in IC4 the 74LS224. You could work out which by comparing the ascii codes of what you get with what you send. But there is no point as all eight buffers are inside the one chip.

The failure to restart when warm, I think, has nothing to do with your son's misadventure. What you have to establish is if this is a power supply problem.

Do this by measuring the voltage of the five volt rail before and after switch on. If this is OK look at the reset circuitry pin 1 on IC39 to make sure this is going low when Break is pressed.

If those check out it is out with the freezer spray and the hair drier to try and track down the component giving you trouble. Use the hair drier to warm up the computer so that the fault shows - don't over-do this - and then the spray to cool down individual chips to find the culprit. Start with the largest chips and those connected to the data bus. Failing that you could always leave the lid off.

Leadless

Q I WAS recently given a Nixdorf printer and was hoping to use it with my BBC B computer. Although the mains lead came with it, the lead from the printer to the computer was missing so I have not been able to use it yet. The machine seems to work however. On pressing the Test button the printer comes up with the information:

Verkehrsnummer 50864.00.7.17
Datum 11.09.86
Version 33 (Ueberarbeitung V03)

followed by a complete printout

of characters and numerals. LQ is also possible. A plate underneath the printer bears the number 2572 03 6009191 and the printer has an RGB input socket underneath too.

Could you tell me if there is any way of making up a suitable lead between the printer and what would be the pin connections for socket and plug at either end of the lead.

K.W. Leeming, Preston, Lancashire

A Unfortunately, I have no information of this printer but I can make some intelligent guesses. The clue is that you say it has an RGB socket. Well it's not for video - I assume it looks the same as an RGB socket on the model B. If this is the only socket then it is bound to be for a serial printer - there simply aren't enough pins for it to be a parallel one.

So now you have to find out what each pin is and construct a serial lead to the model B. The first thing to establish is the earth which is usually the central one, but check with a resistance meter that there is continuity in both directions with the printer disconnected from the mains of course.

Next, power up the printer and

measure the voltage outputs on these pins. You are trying to identify the inputs and outputs. The inputs should have little or no signal whereas the outputs should have plus or minus 3 to 12 volts on them.

Now you need to make up a lead from your computer with the CTS and RTS lines connected together and write a short program to send a continuous stream of data to the serial port.

On the printer end connect an input to an output and feed the data out from your computer to the other input. You should now get some kind of output. If not swap over the input you send the data into and also try different baud rates and parity settings from your computer.

When you have finally identified the printer's serial input you will probably need to connect the CTS and RTS signals as well as the data signal so that the printer does not miss anything.

So connect the RTS on the computer to the other input on the printer and the CTS to the output. Hopefully by then you will have a fully functioning printer.

Otherwise perhaps a reader has some information on this beast.

You can write to Mike Cook c/o Acorn Computing, Europa House, Adlington Park, Macclesfield SK10 4NP.

He will answer any questions about difficulties you may be having with your machines, mainly those to do with hardware. If you want a personal reply ensure that you enclose an SAE with your letter.

Data logging

Q HAVING ignored the Acorn Electron in the past, I have recently acquired a couple of these most excellent computers and find that they still have a lot of life left in them. It is my intention to use them as stand-alone data loggers and for Amateur Radio applications.

I am sure that much information has passed through my hands in regard to these computers, but currently I find that I do not have any information about the edge connector at the rear.

Please, if you are able, can you provide me with details of this or can you point me in the direction of a publication which will reveal all.

Gordon MacNaught, BFPO

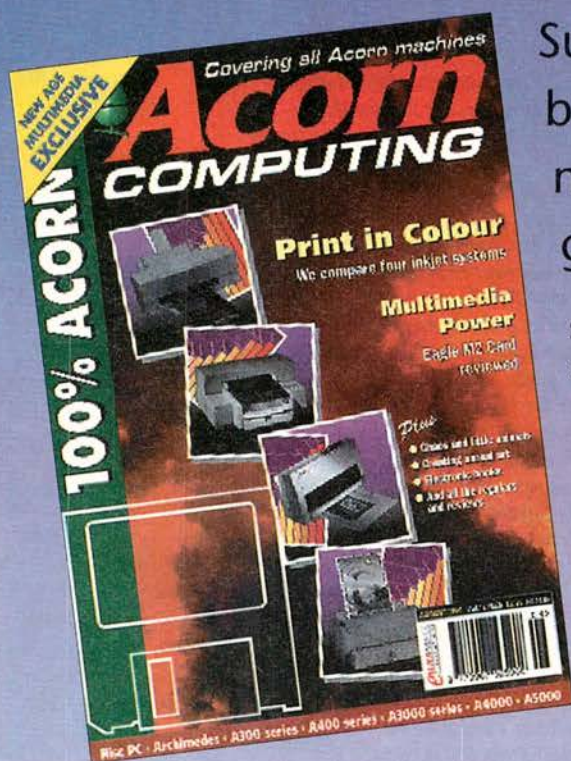
A If you've kept all the back issues of The Micro User you will have seen that in the October '83 issue we launched Electron User in the centre pages as a pull-out supplement.

In that first issue I wrote an article describing the edge connector on the Electron here it is:

Electron Edge Connector

Component side	Pin no	Wiring side
18v AC in	1	18v AC in
18v AC return	2	18v AC return
-5v	3	-5v
0v	4	0v
+5v	5	+5v
Audio in/out	6	16MHz clock
1MHz clock	7	Phase 0 CPU clock
Reset	8	NMI
IRQ	9	R/W
D7	10	D6
D5	11	D4
D3	12	D2
D1	13	D0
not connected	14	not connected
KEY		
A15	16	A14
A13	17	A12
A11	18	A10
A10	20	A0
A1	21	A2
A3	22	A4
A5	22	A6
A7	23	A8
0v	24	0v
+5v	25	+5v

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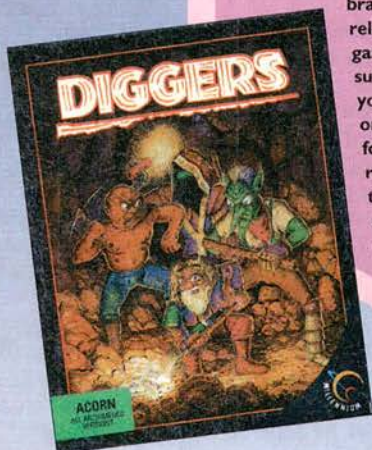
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MAJOR programs on most other computers often come with several hundred printer drivers to cater for even the most obscure printer imaginable. This results in a lot of hassle for the user, who must choose an appropriate printer driver with every new program and a lot of work for the programmer who must write code to print with every program he writes – then test it on each printer.

Under RISC OS, the situation is rather different. Acorn cleverly realised that most of the code to print would be the same in each application, so they provided printer drivers as part of the operating system.

This approach has major advantages for both programmers and users. The programmer doesn't have to worry about writing code to print and doesn't have to test it on lots of different printers and the user only has to configure a printer driver once.

Using a RISC OS printer driver

may seem a little complex at first but it's really very easy to use. The interface is totally independent of the actual type of printer you're using, so your program doesn't have to notice the difference between a humble dot matrix and a postscript imagesetter – just let the printer driver take care of all those nasty complexities.

When you are printing you draw the page using the same commands as you would to draw on the screen. However, the printer driver intercepts them and prints them out instead of plotting them on the screen.

It's slightly more complex than simply drawing the thing you want to print. The printer driver may request the page to be drawn more than once but it's easy to implement a simple printing routine. The principle is roughly the same as redrawing a window under the Wimp and it's quite easy to share code between redrawing and printing.

The current printer

The printer driver provides several calls to find out about the driver currently in use. The first is *PDriver_Info*, which returns general information about the current printer driver:

```
SYS "PDriver_Info" T0 type%, x_reso%
lution%, y_resolution%, features%,
name$, halftone_x_res%, halftone_y_
res%
```

The x and y resolutions of the printer are in dots per inch. You probably won't need to worry about this or the halftone resolutions (in units of repeats of the dot pattern used for greys per inch).

The most useful information is the *name\$* and the *features%*. The former is simply a textual name of the printer. By convention, this is shown in the print dialogue of your application.

The options the printer supports is given by *features%*. Bit 0 is set if the printer prints in colour, bit 11 is set if it supports transformed (rotated) sprites and bit 12 is set if it supports new font features (such as transforming fonts).

It also contains some other information which is less useful for an application. The full description

is on page 3-603 of the PRM.

The other useful SWI is *PDriver_PageSize*:

```
SYS "PDriver_PageSize" T0 , x_size%
, y_size%, left%, bottom%, right%,
top%
```

x_size% and *y_size%* are the size of the paper, and the last four parameters are the edges of the printable page (most applications show these as grey borders around the edge of the page and anything outside these is clipped). These are all in millipoints, which are 1/1000th of a point or 1/72000th of an inch.

Starting a print job

Before you can start printing you have to go through a setting up process. If you are writing a multitasking program you should use the Printer message protocol (page 3-259 of the PRM) to cooperate successfully with other tasks.

Before doing anything else you must open a file to which the data for the printer is sent. This file is always *printer:*. The printer manager (*Printers* under RISC OS 3) sets this so that it either sends the data to some hardware, such as the parallel port, or a file on a disk as required by the user.

While you are testing your program, I suggest you use the print to file option as much as possible to avoid wasting lots of paper.

The handle you obtain by opening the file is then passed to the printer driver. If you're using Basic you can use the command to open the file and start the print job with:

```
this_job% = OPENOUT("printer:")
SYS "PDriver_SelectJob", this_job%,
title$ T0 old_job%
```

old_job% then contains the handle of the job which was current before your printing started. You should keep this so that you can reselect that job afterwards to give maximum compatibility with other programs. *title\$* should be an informative name of the print job, but it could just be the name of your application.

If you're using C, you can't pass the FILE * returned by *open()*



to the printer driver because it's actually a pointer to a structure maintained by the C run time system.

Instead, you have to use `OS_Find` to open the file. Equivalent C code to the Basic above, using the printing facilities (`print.h`) of the RISC OS Library, is:

```
_kernel_swi_regs r;
int this_job, old_job;
r.r[0] = 0x8f;
r.r[1] = (int)"printer:";
if(_kernel_swi(OS_Find, &r, &r) != 0
|| (this_job = r.r[0]) == 0) {
/* the file didn't open report, th
e error and end */
}
print_selectjob(file_handle, "Print
job title", &old_job);
```

It's a bit longer than for Basic as the method for calling SWIs is rather cumbersome, and errors are handled locally instead of using a global error handler.

When you're printing from a C program, it's a good idea to use the print module of RISCOSLib (page 246 of the Acorn Desktop C manual) as it's more efficient than `_kernel_swi()`.

It's important that you handle errors properly. If the print job is not stopped some very strange things may happen, as the printer driver will still be intercepting graphics commands. In Basic, a suitable error handler for a single tasking program is:

```
ONERROR SYS "PDriver_AbortJob",this
_job%: CLOSE#this_job%: PRINT REPO
TS " at line " ERL: END
```

Next, you must declare the fonts you want to use. This SWI is not supported in old printer drivers, so be prepared for an error to be returned. If it is, stop declaring fonts

and continue normally with the print job.

It's important that you declare fonts, even if you declare that you don't actually use any. Some printer drivers, such as the PostScript driver, have to download the fonts if they aren't present in the printer before it can start using them. It can't do this once the print has started due to limitations of PostScript.

You can declare a font using either a font handle or a font

do this if you were printing a two page spread where you could use two rectangles, one for each page on a landscape printout.

The contents of rectangles are clipped to the edge of the rectangle like VDU graphics windows. However, you shouldn't rely on them clipping exactly as rounding errors creep in.

For example, you shouldn't use them as frames in a DTP package. It is suggested you add a margin of about 2 OS units (1 point) around

The Printer Drivers

Ben Summers shows how to steer your programs towards better printouts...

name. The call to declare a font is:

```
SYS "PDriver_DeclareFont", 0, font_
name$, flags%
```

font_name\$ is the name of the font you are declaring. Set bit 0 of *flags%* if you don't want the font to be downloaded even if it isn't present within the printer, and set bit 1 if you're going to use kerning on the font – see the font manager article in the February '94 issue.

After you have declared all your fonts, you should tell the printer driver you have finished:

```
SYS "PDriver_DeclareFont", 0, 0, 0
```

Finally, you must tell the printer driver where you want to print on the page by specifying a list of rectangular printing areas, referred to as rectangles.

A simple printout would just declare one rectangle over the whole page, but you can define more than one on a page. You might want to

the edge as unintentional clipping tends to be rather noticeable.

To declare a rectangle you use `PDriver_GiveRectangle`. In the following code, the DIMensioned memory should be claimed in the initialisation of your program:

```
DIM rectangle% 16, transform% 16, p
lot% 8
rectangle%!0 = low_x%
rectangle%!4 = low_y%
rectangle%!8 = high_x%
rectangle%!12 = high_y%
transform%!0 = x_scale * 2^16
transform%!4 = 0
transform%!8 = 0
transform%!12 = y_scale * 2^16
plot%!0 = pos_x%
plot%!4 = pos_y%
SYS "PDriver_GiveRectangle", id%, r
ectangle%, transform%, plot%, col%
```

id% is a value you allocate, and is used by the printer driver to tell you which rectangle it wants you to draw. *rectangle%* is the size of the rectangle in OS units (1/180th of an inch), and all or any of the dimensions can be negative so you don't need to have the origin in the bottom left of the rectangle.

This rectangle is scaled by

Using ColourTrans while printing

While printing you should always call a `ColourTrans` SWI to set the required colour. You specify the colour you want using 24-bit colour values and call this SWI to tell the printer driver to select the closest colour currently available:

```
SYS "ColourTrans_SetGCOL",colour%,0,0
```

colour% is the 24-bit colour, specified in the form `&BBGRR00` (blue * 16777216 + green * 65536 + red * 256, with each colour intensity ranging from 0 to 255).



transform%. In this example, *x_scale* and *y_scale* control the scaling in the expected directions.

This is a transformation matrix (as discussed in the Draw module article in the March '94 issue), but most printer drivers limit it to scaling and rotations by multiples of 90 degrees.

As with the Draw module, the parameters are fixed point numbers with 16 integer and 16 fractional bits, in effect a real number multiplied by 2^{16} .

To print a landscape page, you need to rotate all the rectangles by 90 degrees, and would use the transformation matrix below:

```
transform%!0 = 0
transform%!4 = y_scale * 2^16
transform%!8 = x_scale * 2^16
transform%!12 = 0
```

pos_x% and *pos_y%* are the positions of the bottom left-hand corner of the rectangle (not the origin) in millipoints from the bottom left-hand corner of the page. *col%* is the colour of the background of the rectangle, in the form &BBGGRR00. White is &FFFFFF00.

The figure below shows the relationship between the rectangle and position coordinates and the position and size of the rectangle on the page.

After this lengthy setting up process, you are ready to draw the rectangles and actually produce

some printed output. You start it off with:

```
DIM to_draw% 16
SYS "PDriver_DrawPage", copies%, to_
_draw%, page%, 0 TO more%, , id%
```

copies% is the number of copies of this page to print, *page%* is the page number, or zero if it's unimportant. After the call, *id%* is the id of the first rectangle to draw – specified when *PDriver_GiveRectangle* was called to create that rectangle above – and *to_draw%* contains the coordinates of the part of the rectangle which is to be redrawn.

to_draw%!0 and *to_draw%!4* are the minimum coordinates, while *to_draw%!8* and *to_draw%!12* are the maximums of this area.

Printing speeds

Simple applications could just draw the entire rectangle but to speed up the process significantly when there are a lot of objects to be drawn, you could test each object and only plot it if it is within this specified area.

more% is non-zero if there are more rectangles to print. You need to perform a loop to get the next part to redraw until there are no more to be redrawn:

```
WHILE(more% <> 0)
IF(id% = 42) THEN
REM draw rectangle 42
ENDIF
SYS "PDriver_GetRectangle", , to_d
raw% TO more%, , id%
ENDWHILE
```

Each time around the loop, *to_draw%* and *id%* are updated. When you draw the rectangle, the printer driver intercepts most calls which draw graphics on the screen, including the Basic drawing commands. The idea is that you draw things as you would to plot them on the screen, but they appear on the printer instead.

You can plot sprites, draw lines, use the draw module and font manager and it will all appear on the printer instead of on the screen. Previous articles in this series have shown how to use the draw module and the font manager.

However, you mustn't use GCOL commands but use ColourTrans to set colours – see the box on how to

do this. This allows the printer driver to select the best match available for the colour you actually want.

If you don't use ColourTrans your printout will vary depending on which mode you're in and how the palette is set up, and will certainly not look as good as if you had used ColourTrans.

The rectangle you gave the printer driver behaves as a VDU graphics window (or the whole screen) – anything which you plot outside it is clipped.

The output you draw is scaled by the transformation matrix you supplied to *PDriver_GiveRectangle* so you can use any units you want.

When the loop has been completed, you can either print another page by giving the printer driver some more rectangles and going through the redraw loop again, or finish the job with:

```
SYS "PDriver_EndJob", this_job%
IF old_job% <> 0 SYS "PDriver_SelectJob", old_job%, 0
```

This ends the current job, and if there was a job active before it is reselected to maintain compatibility. Finally, you need to close the file you opened at the beginning of the job. In Basic, you can use the close command provided:

```
CLOSE# this_job%
```

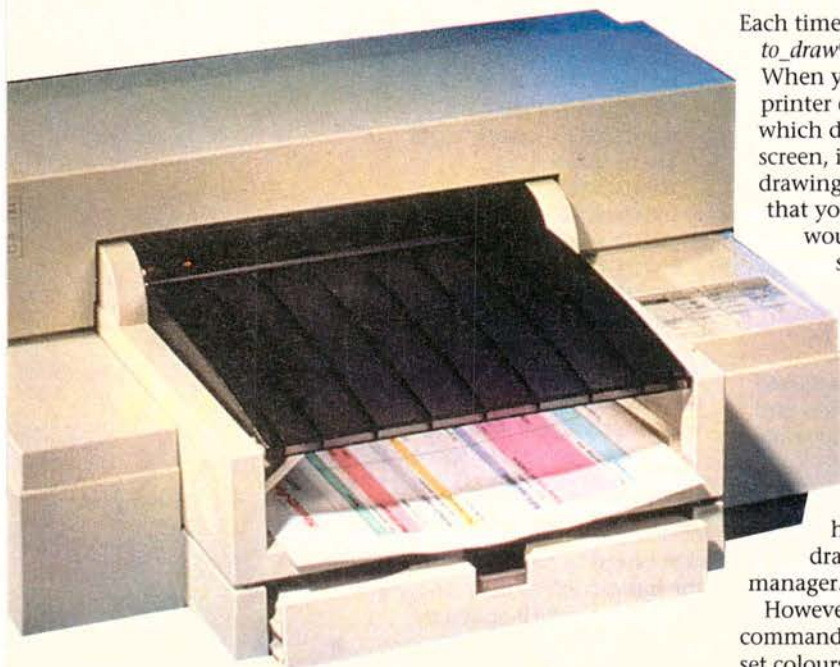
However, in C you need to close it by calling *OS_Find*.

```
r.r[0] = 0;
r.r[1] = this_job;
if(kernel_sw(OS_Find, &r, &r) != 0) {
/* error: report and end */
}
```

This closes the file and you should use the print module of RISCOSLib to end this job and reselect the previous job, as in the Basic example.

There are several example programs on this month's MegaDisk. Example1 shows how to print a page using Basic drawing commands. Example2 extends this to include a draw module path and a font and also demonstrates clipping of rectangles, and Example3 shows multiple scaled rectangles.

This process may seem complex at first, but it's a lot easier than writing it all yourself. When you try using the printer drivers, you'll find that it's really easy to produce wonderful printouts.



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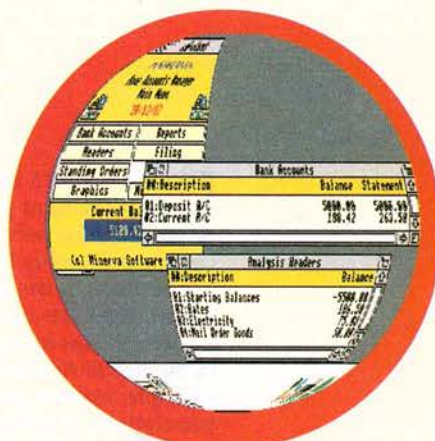
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SPREADSHEETS have become one of the most popular types of program for personal computers, largely because of their applications in the financial world. But spreadsheets can be used to explore the far more exciting world of biological simulations – for example, making models of how populations of living things fluctuate from year to year.

Using a relatively simple formula and the speed and graph-drawing ability of an Acorn machine, we can get some fascinating insights and even approach the borders of chaos theory.

Before we start to build a

one year are 100 and the growth factor is 1.2, the population the following year would be 100 times 1.2, or 120.

While it serves to get us started, this is not really good enough. If the population increases by the same factor every year soon there will be not enough room on the island for all our little mammals to stand, let alone enough food for them to eat.

What we need is a formula which also allows for the fact that there are limits to the growth of our animal population – something to cover famine, growth of a predator population or spread of disease due

has dynamic graphs will do.

The instructions that follow are for Pipedream users, but you should be able to adapt them without any trouble.

Start by opening a new, blank spreadsheet. In cell A1 enter "Growth factor =", making sure that the column is wide enough to take the full text on one line. Then in cell B1 enter a starting value for the growth factor – let's begin by setting it to 2.

Now start to build the main part of the spreadsheet by setting up some column headings. In cell A3 put "Year" and in cell B3 "Population". Enter the value 1 in cell A5 – this represents the first year of our series.

In cell B5 enter the starting value for our population of little animals. This figure is not very important – let's say there are 400,000 creatures in the first year so enter 0.4 in cell B5, for 0.4 million.

The next step is to create the second line of the table. This is where we enter the formulae. In cell A6 enter the formula A5+1 – if you are using Pipedream 4, don't forget to press function key F2 to enter a formula. Enter the following formula in cell B6, exactly as it is laid out here:

$$B\$1*B5*(1-B5)$$

This is the formula which calculates the population in year 2. Note the use of the \$ sign in the expression B\$1. The \$ sign means that whatever we do with the formula, this part of the expression will always refer to the value in cell B1, ensuring that the same growth factor is used every year.

Set the number of decimal spaces in column B to 7 using the Layout -> Decimal Spaces option from the menu.

Now we can really use the power

to overcrowding.

There is a formula which does just this – it is well known to mathematicians and is called the *logistic difference equation*. This is what we shall use for our model.

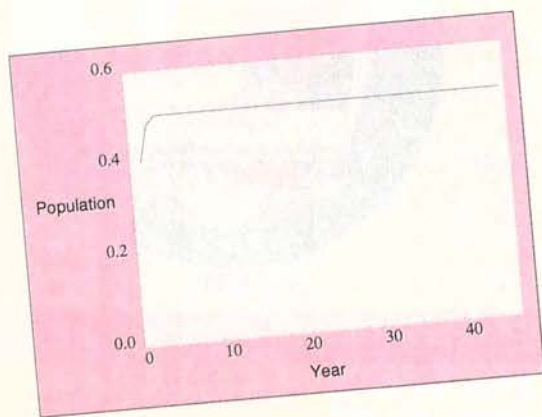
Now we can start to build a spreadsheet and in doing so we shall make use of the *replicate* command. Pipedream 4 is very suitable for our purpose as it allows multiple windows and has a very good capability to produce graphs which are dynamically linked to the spreadsheet data, although any spreadsheet that

spreadsheet, let's just take a few moments to think about what factors affect the growth or decline of an animal population.

In order to make it easy we'll use some imaginary small mammal on an island. To start with it is clear that the population in any particular year is going to be heavily influenced by the population the previous year.

Just how it is influenced depends on a myriad of factors but we can begin by assuming that the population in one year is simply the previous year's population multiplied by a growth factor.

For example, if the numbers in



● Chart 1:
A static
population

Pipedream: adfs::IDEDisc4.\$DTP.article.Logdif *					
	A	B	C	D	E
1	Growth factor =	2.000000			
2					
3	Year	Population			
4					
5	1	0.400000			
6	2	0.480000			
7	3	0.499200			
8	4	0.499998			
9	5	0.500000			
10	6	0.500000			
11	7	0.500000			
12	8	0.500000			
13	9	0.500000			
14	10	0.500000			
15	11	0.500000			

● Figure 1: Access
the logistic
difference equation

of a spreadsheet. With the cursor in cell B6 press Return and hold it down until your spreadsheet has about 200 rows. Then highlight the two cells A6 and B6 by wiping the mouse across them while holding down Select.

Without releasing the button move the pointer to the bottom of the window, just below the lowest cell in column B, and hold it there until the marked block extends to about row 200.

Then click Menu to select the command *Block -> Replicate Down*. Press Home and your spreadsheet should look like Figure I.

Run your eye down the list of figures in column B. You will see that the population grows rapidly to 0.5 million, where it stabilises. You can see this effect very clearly by using Pipedream 4's graph facility. Mark a block of about 50 rows of columns A and B starting at row five. Click Menu and select *Chart -> New chart*.

Use the Gallery option to select a two dimensional line chart and you should see the graph shown in Chart I. What is happening in real terms is that the conflicting pressures for population growth and population reduction, which are built into the equation, are finding a point where they are just in equilibrium so the population stabilises.

At this point, experiment for yourself with different growth factors. That is to say, enter different figures in cell B1. For growth factors less than 1.7 the population declines more or less rapidly to a stable level.

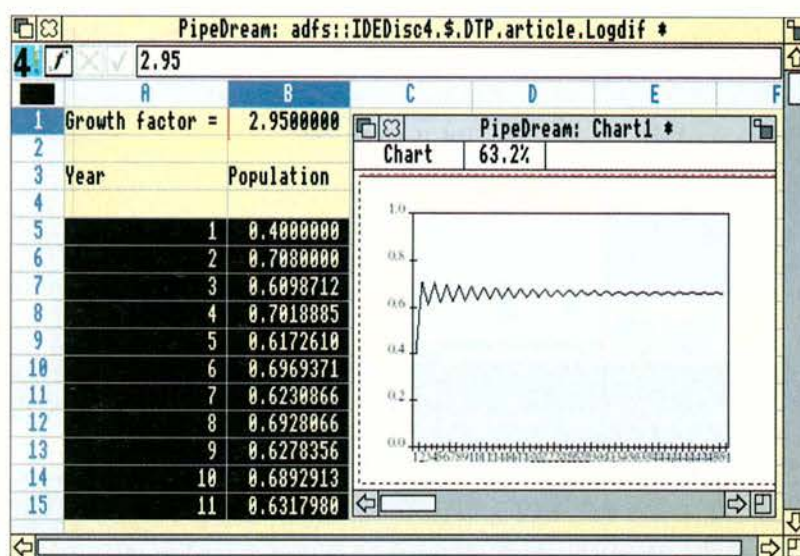
For growth factors greater than 1.7 it rises to a stable level, albeit with a short period of overshooting when the growth factor exceeds 2.5. Can you find any growth factors which give significantly different results from these? What happens if you use a growth factor of less than 1?

In fact there are several growth factors which give very different results, and it is these differences which make the logistic difference equation so interesting.

Arrange the windows on your screen so that both the graph and the first few rows of your spreadsheet are visible. Your screen should look something like Figure II. Now key into cell B1 a variety of different growth factors, starting at 2.5 and increasing in increments of 0.1, and look at the results.

When you get to 3.1 something remarkable happens. Instead of stabilising at one level, the population instead starts to oscillate

● Figure II:
Varying the
growth factors



between two levels.

Every two years it goes through the same cycle of increase and decrease. Continue to increase the growth factor in increments of 0.1 and when you get to 3.5 the pattern changes again.

Now the population fluctuates in a constant cycle between *four* stable levels. Continue increasing the growth factor, but this time in increments of 0.01, and you will see that when it becomes greater than 3.54 the number of stable points doubles again to eight. If this is not clear from the graph, have a look at the figures in the last few rows of your spreadsheet.

Carry on increasing the growth factor until you get to 3.6. At this point another remarkable thing happens. The pattern starts to break down and by the time the growth factor is 3.7 the population fluctuates in a completely chaotic manner. Now it is time to get a longer-term view.

Delete your graph and replace it with one that shows about 100 rows. Continue to increase the growth factor and the population variation remains chaotic until you reach a growth factor of 3.84, when a pattern of oscillation between stable points is re-established.

The interesting thing this time, though, is that the population moves cyclically between three stable values, rather than two, four or eight. What do you think happens when you increase the growth factor still further? Use values of 3.845 and 3.848 to find out.

You will probably have to look at the last few rows of your spreadsheet to see exactly what is happening – it shows a more

accurate picture than the graph.

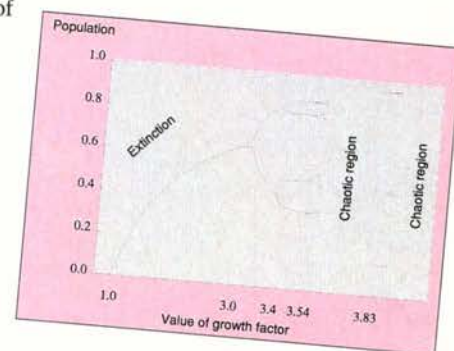
If you have the patience you can record all the stable populations in another spreadsheet and plot a graph of stable population levels against increasing values of the growth factor.

You should get a result something like Chart II, although for clarity I have taken some liberties with the horizontal axis in my graph. This is one of the early graphs produced by the pioneers of chaos theory back in the 1970s, when powerful computers first made it possible to carry out investigations of the logistic difference equation.

That is all there is space for in this article, but continue investigating the logistic difference equation further yourself. Try to find out under what conditions the populations go extinct. Set the growth factor to a negative value – try minus 1.2 – and see what happens.

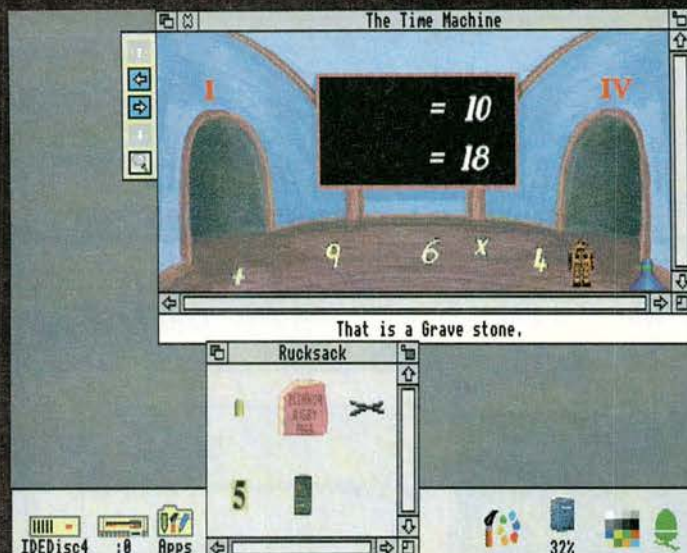
Investigate exactly what happens at the point where the population changes from cycling between stable levels to total chaos. Does the number of stable points continue to double or is there a limit? What happens if you use a bigger spreadsheet with more rows?

Finally you could try modifying the equation to make it a better model of the factors affecting population change. But perhaps that should be the subject of another article.



● Chart II: A
total loss of
equilibrium

THE TIME MACHINE



It is some time since your encounter with the Haunted House in Hobbs Lane and life has tended to be a little on the quiet side. All at once, the idea shot into your brain. You had to get out, take some exercise, go for a nice walk. You grab your rucksack, lock the door and take the plunge! A mile or three of brisk walking soon began to take effect, the woes of the auction rooms fading into the distance. In fact, despite the drizzle, you feel quite well. Unfortunately, you could rather do with finding a little boys room. Then in the distance, past some deserted roadworks, you spot salvation – A blue box! But this was no ordinary Portaloo, as you were about to find out.



THE TIME MACHINE

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The year is 2038 and FEDNET's viewing figures for Stunt Racer 2000 are better than ever. It is believed that this is due to the fantastic racing which was seen in the '37 season. Because of the enormous success of the sport, FEDNET had no alternative but to construct a further 17 tracks for the 'Road Demon's' to devour. That man 'Wild Bill Hiccup' the designer of these fiendish new tracks is quoted as saying that if anyone manages to complete a lap of the FINAL track, then he will personally provide that driver with a race in his \$1M supercar. Are you brave enough to take up 'Wild Bills' challenge? Or has Bill really beaten you all, as he claims?

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In addition to the **Wentworth Course** which you get free with **Virtual Golf**, available now is this brilliant extra course to add to your enjoyment of the simulator. With ball flight and performance accurately compensated to simulate local atmospheric conditions, this disc is a must for all golf fans. **VIRTUAL GOLF's** unique control method, using the mouse to actually 'swing' the club, has won the game praise from established Golfers and Armchair Specialists alike. Included on the disc are Six Tournaments, Replays, Driving Range, Course Viewing Options, Left Handed Facilities, Match and Stroke Play and much more.

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Win your own Scrabble collection

First prize

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- Children's Scrabble
- Travel Scrabble
- Collins Oxford Dictionary

10 Runners-up

- Five copies of Scrabble Board game
- Five copies of Children's Scrabble

THE computerised version of Scrabble has been long awaited on the Acorn 32-bit machines and courtesy of US Gold you can now play with friends or against the computer. Pit your wits against a variety of skilled opponents with a built-in dictionary to keep track and score.

Exclusive to Acorn Computing readers, US Gold are offering a selection of different games of Scrabble which can be played away from the computer to hone your skills whether at home or en route to another contest of wits. Scrabble is the world's leading word game and fascinates both young and old alike.

What to do now

All you have to do is make your highest scoring word from these eight letters:



A = 1 point, G = 2 points, R = 1 point, M = 3 points, N = 1 point, T = 1 point, Blank any letter you like – but scores 0

The first 11 highest entries to be pulled from the sack will receive one of these classic game sets. All entries must be received by 31 August 1994.

Entry Form

Name _____

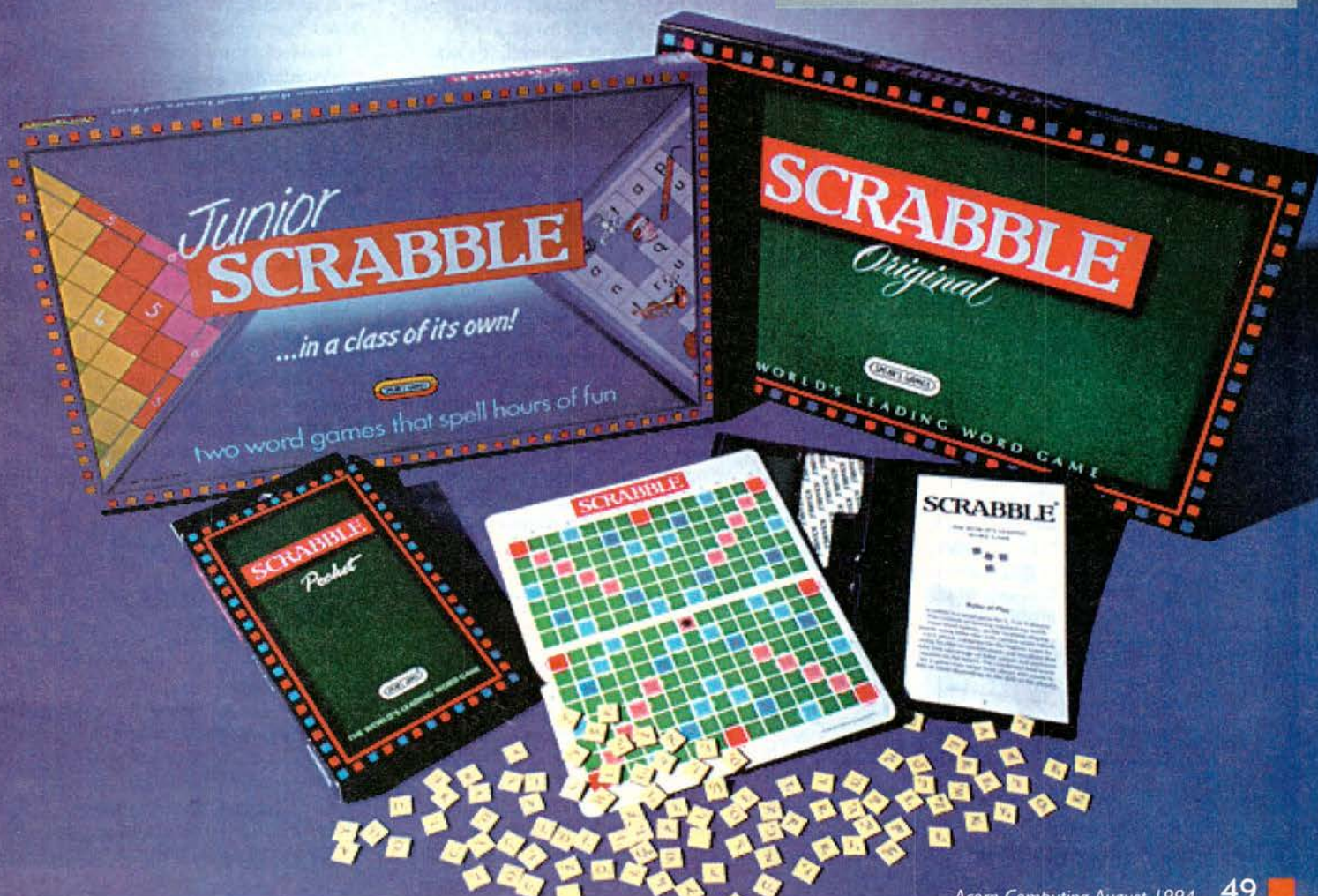
Address _____

Postcode _____ Tel _____

My highest scoring word is: _____

Now send your entry form to: Scrabble Competition, Acorn Computing, PO Box 2, South Wirral, L65 3EA.

☐ I do not wish to receive any further promotional information on products or services



THE first version of the Schema spreadsheet appeared in late 1990 and the delay in the arrival of this new version is extreme, in computer software at least. There was what might be called an interim version in the form of the spreadsheet in the Acorn package Advance.

Originally Schema was in competition with Pipedream 3 – the spreadsheet/word processor/database in one – but now its two competitors are Eureka, which strongly resembles

a PC spreadsheet, and Resultz which is a pure spreadsheet from the makers of Pipedream but which can integrate into Fireworkz along with the Wordz word processor and, eventually, Recordz, a database. I'll be comparing Schema

2 with these others where appropriate.

The Schema 2 packaging is fairly compact, a slip box with a single spiral-bound manual and two disks – one with the application installation program, the other with oddments like data converters, system and so on.

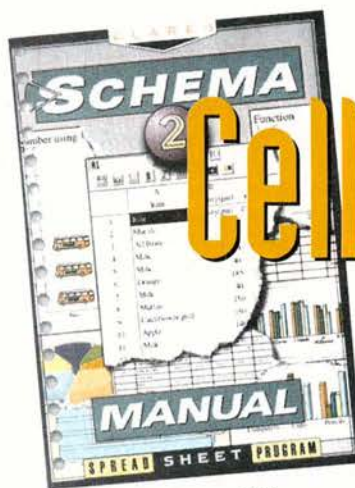
Learn by example

I don't particularly like this form of binding for a manual. It does allow you to lay it flat, but you lose the covers almost immediately, at least I did. However, it's the contents that really matter.

I started by working through the tutorial examples and found the style acceptable, though a little rough in places. There are various *real* examples

based around the College of Irrational Sciences and its staff, which give a good grounding in spreadsheet basics and use of Schema 2 in particular.

After the tutorials come the Techniques, a series of short chapters describing ways of doing commonly-required operations and



cell division

The upgrade to the original Schema finally arrives.

Steve Turnbull takes a look

running through all the facilities of the application.

How it looks

Unlike most other spreadsheets, Schema 2 uses a fixed size approach. That doesn't mean that you can't change the size, you can, but usually a spreadsheet has a floating size, so there are always more rows and columns to expand into. This has some advantages but it makes the size of a scroll bar – one of the fundamentals of RISC OS – meaningless.

In Schema 2 you set the rows and columns when you start, then change them as required. It's no hardship to do this and it conforms much more to the RISC OS concept.

A default-sized spreadsheet is created by clicking on the iconbar icon, as you'd expect, but you can select the Create option from the iconbar menu to modify the start size.

Each spreadsheet window has a pane at the top containing an input area, a set of special icons that aid input and an optional icon ribbon which allows commonly-used functions to be accessed.

Of the comparable spreadsheets, Eureka uses a single input window which is separate from the sheet windows and Resultz, uniquely, performs input within the cell itself which, it could be argued, is the logical place to do it.

Macros and variables

There are a wide range of functions available as you would expect from a package that is expected to compete with other professional packages. However, much more importantly, it's possible to create new ones using the macro facility.

Many of the functions that are supplied with the package are macros, based on the fundamental

functions of the package. To keep the size of the main application down, the macro creator and compilation program is a separate application.

You simply put together the macro, compile it and then load it into Schema 2 for use. If your macro is something you will always want to use, you can put it into the *Auto* directory inside the Schema 2 application itself. Otherwise you can arrange for it to be loaded as part of a workspace, of which more later.

The macro manual is supplied free but separately on request so that those people who don't need it won't have a piece of chopped-down forest on their conscience.

I have to admit I didn't like the macro manual at all, only a programmer needs one and a programmer wants a few guidelines plus an alphabetic list of the commands available – I couldn't find anything easily.

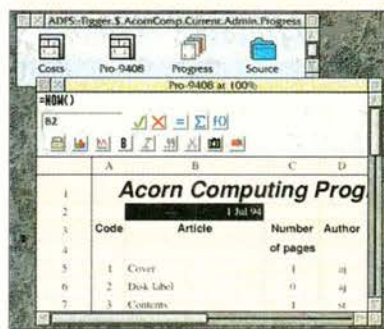
The macro language is quite extensive, being a good subset of BBC Basic along with all the special functions needed to perform any operation on the spreadsheet that you might normally carry out with the mouse and keyboard.

This level of sophistication might seem unnecessary but with Schema 2, unlike its competitors, you can create standalone applications where the user does not need to touch the underlying spreadsheet at all.

Text handling

One of the more impressive features of Eureka is its text-in-a-cell handling. You can force it to word-wrap and adjust the size of whole blocks of cells, for example, to accommodate long column headers easily. Resultz is also quite powerful in this respect, allowing cell column widths and heights to be changed independently.

Schema 2 provides only fairly basic facilities. You can make long headers word-wrap but you have to

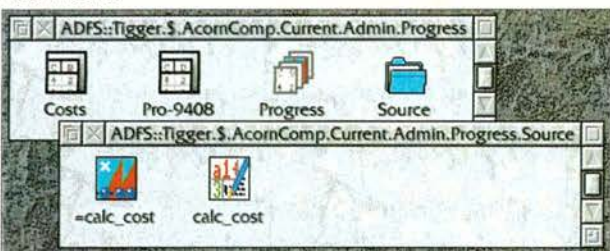


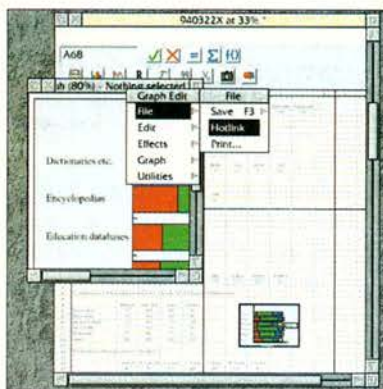
● How the worksheet window looks, the icon ribbon can be changed

PRODUCT SPOTLIGHT

Product: Schema 2
Price: £135
Supplier: Clares Micro Supplies, 98
Middlewich Road, Northwich,
Cheshire CW9 7DA
Tel: 0606 48511

● A workspace with worksheets and macros





● The graph embedded into the spreadsheet itself

create individual *big cells* for each one, which can be time consuming if there's a lot of them.

I used a survey report contained in a CSV file as one of my test files. Every question had a number of column headers and many of them had to be word-wrapped to keep sensible column widths – it took quite a while to sort it out.

The *Big cell* is a concept that's unique to Schema 2. It is what it says – one cell that is expanded to fill the space of a rectangular block of cells. This can be filled with text or graphics, or a dynamically-linked graph. It's an easy concept to grasp and works fast.

The big cell has definite advantages when creating centred headers and other decorative items on a page, because if you adjust the size of any of the underlying rows or columns the *big cell* changes with it so, for example, text will always stay centred even if you change the width of the area it's covering – not easy on Eureka.

The other main use for the big cell is to include dynamic graphs – ones which change when the data they refer to within the spreadsheet changes. Dynamic graphs are *de rigueur* nowadays – Resultz has them but Eureka doesn't.

Making applications

Alone among spreadsheets, Schema 2 is almost completely customisable. You can alter the menus, what icons appear on the icon ribbon and what the user actually sees of the spreadsheet itself.

Through the use of macros, changing key shortcuts and multiple spreadsheets, you can build up specialised applications so that an inexperienced user can input values and get appropriate output without actually having to know what's going on underneath.

One of the keys to this is the

Workspace. This is a special file type which records all the worksheets and macros that are currently in use and where they are stored. Double-clicking a Workspace loads up all the worksheets and macros. In addition, whenever a spreadsheet is loaded it's possible to have a *boot macro* that is automatically executed.

The more mundane use of Workspaces is that you can save the current state of your Schema system, then restart later at exactly the same position.

Eureka also permits linking between spreadsheets but needs the entire file path wherever a reference occurs so that it knows the location of the required spreadsheet – this is rather unwieldy.

The Workspace system is much more convenient and logical, especially as the disk locations of spreadsheets are stored *relative* to the position of the Workspace file, meaning you can move the whole lot to another directory or disk and it will still work.

Data export

The Advance spreadsheet had to interface smoothly with the other applications in the suite. This meant that Acorn had to devise a global clipboard protocol – you can cut data from the spreadsheet with Control+C and paste it directly into the word processor with Control+V, for example.

Computer Concepts wrote the word processor for Advance and Iota wrote the database. This now means that Impression Style and Publisher and DataPower both support the global clipboard and you can cut and paste from any of these into and out of Schema 2.

For software that doesn't support it, you can also export spreadsheet data as CSV, TSV, draw file or you can send the results formulae out as a text file, or save as a Lotus 1-2-3 file.

Printing

Getting hard copy from a spreadsheet is probably the hardest part because they tend to be so large. Of the three spreadsheets, Resultz probably has the best printing facilities for one simple reason: It's true *wysiwyg* and you can see the pages on screen – this is enforced by its need to integrate with the other parts of Fireworkz.

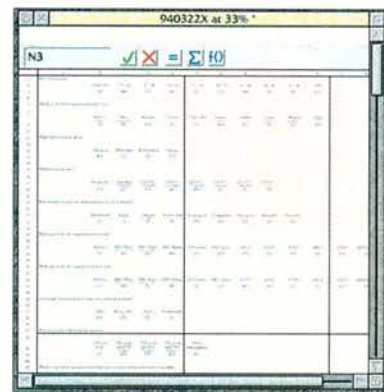
Until now I've used Eureka but I've always found its print options to be too complicated. So complex,

in fact, that giving it the option to fit on to a single page width-ways got it confused and it refused to print completely. I usually have to export as a draw file into Impression, then print.

With Schema 2 you don't have the *wysiwyg* ability of Resultz, nor the complexity of Eureka, and I've had no problem printing. The print border is marked by a slightly heavier grid line and by zooming the spreadsheet down to a fairly small size, it's easy to see what pages will be printed.

From there you can alter the print scaling to reduce or increase the number of pages that are printed. This is made much easier by clicking with Adjust on the Save button of the print dialogue box, which causes the current option settings to be reflected in the worksheet window without losing the Print dialogue itself.

The only thing I really missed from the Print dialogue was the option to remove the row and column labels and the grid, but as this performs a true *wysiwyg* print you just remove them from the main display.



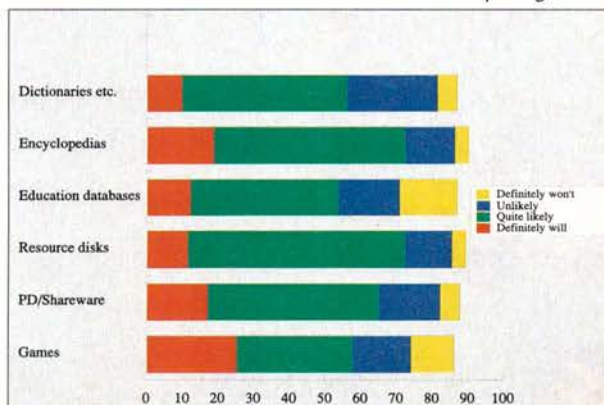
● The page breaks are displayed as heavy lines

Summing up

While not without its limitations, I found Schema 2 to be an extremely competent spreadsheet. It's cheaper than Eureka and about the same price as Resultz. Each of the spreadsheets mentioned have their areas of strength – I wouldn't buy Schema 2 if I wanted an integrated package like Fireworkz.

However for pure spreadsheet operation, the macros and the customisation potential, I believe Schema 2 to be the best available – it's certainly my preferred choice now.

● A sample graph from the Acorn Computing survey



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19th Century Biographies

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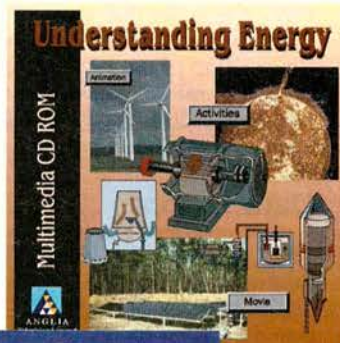
World War II - On the Home Front



Art Store - Looking at Animals

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The Industrialisation of Britain



... and there's more to come



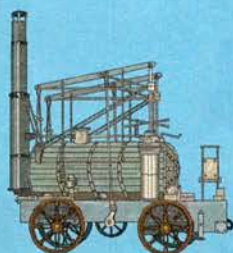
Anglia Television Education is well-known for the integrated KEY system which operates across the Acorn and IBM and compatible (Windows™ 3.1) platforms. It also now offers a wide and growing range of CD-ROM discs, created initially for the Acorn range of computers, and making full use of RISC OS facilities. Starting at just £25, these discs offer a rich experience for the classroom or home use. Map discs, for use with the KEY range of software, include many GIS (Geographical Information System) facilities. Stand-alone discs give hundreds of pages of information, covering topics from human biology to castles, weather and climate to art from the principal British galleries. Animations, video sequences, drawings, commentaries and clear text all combine to provide insight for the inquisitive mind. Activity sheets, timelines, databases, a selection of on-screen tools, glossaries, reconstructions and the facility to move materials to your own work area all add to the value of the discs.

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KEY initiatives
across the curriculum

The short list

This month our team looks at accessing files old and new

Z-Link II: Accessing the portable

CLIVE Sinclair's Z88 portable and Acorn's RISC OS computers have software in common, the word-processor and spreadsheet PipeDream. This made the Z88 an ideal low-cost portable partner in the days before the A4 and Pocketbook.

The traditional way to transfer files is to use the Z88 Filer supplied with RISC OS PipeDream and buy a separate software cartridge for the Z88. This Filer does not work well with RISC OS 3.1 and so the release of Z-Link II is timely.

Using the link is simple enough. Connect the serial ports of the two machines together with the lead

supplied and, once the link icon is on the iconbar, any file sent from the Z88 via its Import/Export utility will appear in a standard RISC OS save box, allowing it to be stored on the Acorn machine. Z-Link II decides whether the file is in PipeDream or plain text and gives it the appropriate filetype.

In the other direction set the Import/Export utility on the Z88 to receive a file and drag the required RISC OS file to the Z88 Link II icon.

Transfers from the Z88 can be made even easier by setting a directory on the Acorn computer to automatically receive files. Other options allow you to abort or suspend a transfer.

At present it is not possible to transfer binary files, such as Basic programs, so it is not

suitable for keeping a complete backup of the Z88's files, but I understand this will be possible in a future version.

The other problem I found was that the 9-pin D-plug at the Z88 end of the cable does not fit securely in the Z88's socket. I would advise replacing the cover with one that is flush with the back of the plug metalwork.

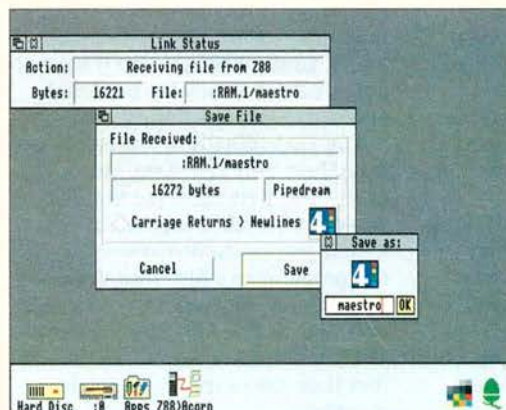
Z-Link II is a straightforward application which makes transferring files between a Z88 and a RISC OS computer simple. By the way, the Z88/Arc cable is a special one.

PRODUCT SPOTLIGHT

Price: £24.95 and serial link cable £9. Together £29.95.

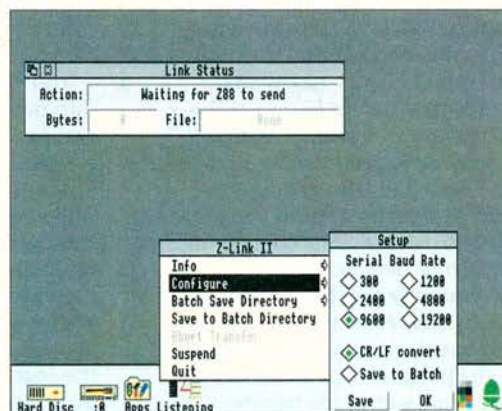
Supplier: Really Good Software Company, 39 Carisbrooke Road, Harpenden, Hertfordshire AL5 5QS. Tel: 0582 761395

John Allen



● Receiving a file

● Setting options



Vertical CD-Rom: Low cost, fast access

There's always a difficulty when reviewing hardware – either it works or it doesn't, in which case there's not much point in reviewing it. Well, the good news about this CD-Rom drive is that we're reviewing it, so it works.

The test machine was a Risc PC which already had an internal Cumana CD-Rom drive and a SCSI interface fitted. The Vertical Twist drive plugged in directly along with its internal power supply – which uses a standard, separate "kettle" lead.

A driver for the particular hardware

was added to the boot sequence, the number of CD-Rom drives increased to two and finally the SCSI device number on the VT drive set to 1 – an extremely easy operation, unlike the bad old days of SCSI.

No special software is required apart from the actual driver, as long as you have CDFS version 2.20 or better. VT will supply a SCSI interface for £99 if you don't have one.

I took a look at various CD-Roms, ran movies and music from the Acorn sample disk, tried out the Clares PhotoCD and it all went smoothly.

What can I say? It's a good price and it works.

Steve Turnbull

PRODUCT SPOTLIGHT

Price: £199 (subject to availability, SCSI Interface £99)

Supplier: Vertical Twist, Unit 3, Kingley Centre, Downs Road, West Stoke, Chichester PO18 9BQ
Tel: 0243 574514

MultiLink: Out with the old

AS I look round my office, I saw it was beginning to look like a museum of computing. Wherever my glance fell, I was confronted by the historical evidence of my love affair with *Information Technology*: The Risc PC proudly displaying centre-desk, an Archimedes 440 looking rejected at one side, hoping for a promised network card to re-establish contact with life in all its myriad (well, 32-bit) complexity.

There's a venerable Adler manual typewriter, built like a tank and still the best choice when there are forms to fill in. And finally, in the corner, long-relegated to minor tasks, the faithful BBC Model B with

its lowly 32k of ram and primitive 100k floppies.

With no more space for sentiment my BBC B must go to gather dust in the attic, scorned by my kids for its

monochrome character display and not worth the price of an ad in Exchange and Mart. Just one problem. I can't do without it.

There are a couple of programs in spaghetti Basic which I regularly need and a database in InterBase which updates a spreadsheet in InterSheet on which I maintain records of clients' payments.

Transfer the lot to one of the 32-bit machines. Easy. But is it?

BBC Basic has evolved a bit since the Beeb, but the versions are compatible. So how do you get your Basic files off 5.25in floppies and into your new machine?

Assuming you have better things to do than enter them from the keyboard, you need to connect the serial ports of your machines and use some sort of file transfer software.

What you need is MultiLink which runs on your RISC OS

machine and provides a link to the BBC Micro or Master, but not Electron, across which you can pass data simply by dragging files.

MultiLink uses the serial link so you need a cable with 9 pin D connector for the Arc and that terrible 5 pin DIN connector that can go any of four ways up into the BBC Micro's serial port.

If you haven't got a suitable cable you can get one from RGSC with the software. You have to set serial comms parameters on the BBC Micro. This is done by the quaint method of issuing FX calls: *FX7,7 sets the baud rate to 9600 and *FX 2,1 opens the port for transmission. If it's not set up right MultiLink puts up a message on the Arc which tells you which commands you should use.

There's a short delay while MultiLink downloads a program to the Beeb and the link is established. Clicking on the BBC icon now available on the left of the icon bar brings up a window in which you can view the disk contents of the BBC Micro.

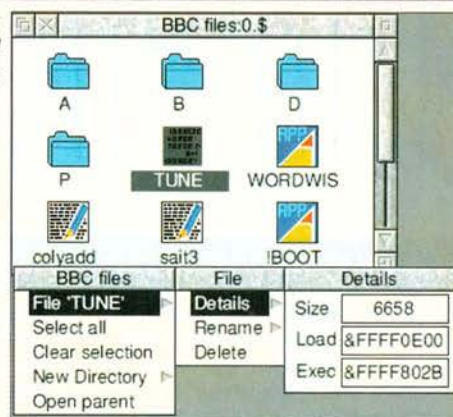
You can send it * commands, look into directories, check file details and so on. From the window you can see the contents of your BBC disk displayed as you've never seen them before. Then just drag them to the chosen directory in the usual way.

As MultiLink doesn't actually add a filing system, it has the disadvantage that you can't treat the Beeb as a disk drive - no great loss there. But it does multi-task, even on RISC OS 2 machines, when transferring via the very slow serial link, so you can get on with other things while the files come across.

So I copied all my files over and then, in my innocence, I thought I'd be able to run the transferred Basic code without modification. I couldn't. These are the changes I had to make:

Data files: Your program probably reads and writes to data files so you need to correct the path to them. If, formerly, you had a data file called *data* in the root directory of your floppy, your program will

● Accessing those old BBC files



have addressed it as *data*.

If it is now to reside in a root sub-directory called *Beeb* you'll need to address it as *ads::4.\$Beeb.data*. Drag the program code into Edit and let Search and Replace do the hard work.

Access: Your program may unlock and lock its data files. These don't conform to RISC OS file locking. Remove any lines containing this type of command.

Drives: If you had a double floppy drive with your BBC you may have addressed the drives as 0 and 1. Under RISC OS you'll want to address drive 4 for your hard disk and drive 0 for the floppy.

The remaining task was to run my InterSheet and InterBase. The problem is that these are not disk-based on the BBC, they're in rom. Unless you do an illegal rewrite of the program to a BBC disk, it can't be accessed by MultiLink. Your only option is to buy RISC OS versions if you need them and transfer the data files they use in the way already described.

If you've just bought a Risc PC you probably won't feel very enthusiastic about shelling out for 8-bit software, so the best option is to transfer the data in some easily interpreted format like ascii or CSV and load it into a suitable RISC OS application.

You will have to set up template spreadsheets or database files to accept the data, but you'll end up with a modern fully-featured application controlling your data and it'll be worthwhile in the long term.

At last my BBC Micro software is running under RISC OS, with the added advantage that I can click on natty icons instead of laboriously typing *CHAIN":1.\$Wombat"* or whatever.

Clem Vogler

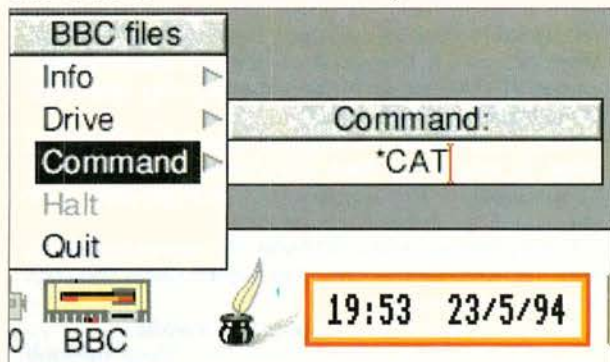
PRODUCT SPOTLIGHT

Price: £24.95 and serial link cable £9.

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Supplier: Really Good Software Company, 39 Carisbrooke Road, Harpenden, Herts AL5 5QS. Tel: 0582 761395

● Mixing the old and the new



MacFS: Accessing the apple

FOR anyone involved in professional desktop printing the ability to access disks from a variety of platforms is very important. Until now Apple Mac files could only be accessed via PC format, but no longer. There are still however, some restrictions on this access.

As the lower-density Apple Mac drives were of variable speeds, Computer Concepts are concentrating on the ability to read, write and format 1.44Mb floppies which are now standard in Apple Macs.

On the Acorn side people with older Archimedes – A300/400 series and the A540 – will also be denied access as your machine must be able to read high density floppy disks. The RISC Developments external high density floppy drive may be a solution but I haven't been able to check this out.

In addition, if you have a SCSI interface you can read and write Mac SCSI interface disks such as hard disks, SyQuest cartridges and magneto-optical disks, though these

cannot be formatted.

Once installed you'll see no visible difference to your desktop. However, when you click Menu over the drive icon and follow the sub-menu to *Other formats* you'll find the Mac 1.44M added to the list.

However, what you then do with the data is down to your machine and the software you have running on it. You can transfer data files which are common such as ascii, TIFF, PostScript and EPS and read them in a variety of programs, but you'll have problems trying to read a sprite file on a Mac or MacDraw file on a RISC OS machine.

For most people this will be sufficient, but be aware that filenames on the Mac can be 31 characters long – on the RISC OS machines only 10 characters are allowed. Depending on the setting of the *Truncate* option, RISC OS machines may truncate too long Mac names which can result in files being overwritten.

The manual covers most of the information you need to know for

transferring data and files. However, if you want greater control over the Mac files, you have this with access to *data* and *resource forks*. MacFS also contains a table of equivalent file types ensuring that files appear with the correct icon on both computers which can be edited.

This is particularly useful as Mac files contain information about the origin of the file which may require some changes, as some programs only read files they have created. The documentation will help here too.

MacFS is very straightforward to use and acts just like the PC and Atari options and is another plus for the RISC OS platform. One final reminder, Apple Mac disks formatted to 1.44Mb must be a true two-hole high density floppy or the Mac hardware will not recognise it.

Pam Turnbull

PRODUCT SPOTLIGHT

Price: £99

Supplier: Computer Concepts,
Gaddesden Place, Hemel
Hempstead, Herts HP2 6EX.

Tel: 0442 63933

Requirements: RISC OS 3.1,
1.6Mb disk drive

Image FS: Boundless pictures

With the incredible diversity of formats for bit-mapped images on other computer platforms, coupled with the ability to load data from other systems, it becomes very inconvenient for applications to know about all these different formats.

It's a snag that's analogous to the printing problem. With so many different printers how can any application know about them all, and why should the user have to worry about it?

The single independent printer application solved the problem on the 32-bit machines – just load the printer driver for your printer and every application can now print to it. The application doesn't need to know what printer you've got.

As yet there is no standard bit-map loader for applications that

need to know. Computer Concepts have their system which involves independent converter applications. It's very comprehensive and we'll cover that another time.

But the other contender is ImageFS. What this does is convert alien bit-map formats into Acorn sprites completely transparently to the user or the application.

What it means is that you can double-click an Apple PICT2 file, for example, sitting on a Mac disk – if you've got MacFS – and have it load into Paint as an 8bpp or 24bpp sprite (your choice).

If you're using an older machine you can set the dither option when creating 8bpp sprites, either none, simple or Floyd-Steinberg error diffusion techniques.

One of the cute features of ImageFS is that it allows you to view the picture before you do anything

else with it. By Control+double-clicking on the picture's icon, the *TinyView* window pops up so you can take a look at it. This means you can zip through a directory looking for the correct image. *TinyView* also works with ordinary sprites.

The table shows the file types currently supported and there are few more on the menu now greyed-out – SunRastr, GIF and AmigaIFF – which will be implemented shortly.

The ImageFS module currently occupies just 32k and uses about that much again when converting files – the front-end uses up 64k but it's not required during normal operation.

Steve Turnbull

PRODUCT SPOTLIGHT

Price: £34.95

Supplier: Alternative Publishing,
Pentagon Centre, 38 Washington
Street, Glasgow G3 8AZ.

Tel: 041-248 2322

File type	Description/Source	1bpp	2bpp	4bpp	8bpp	16bpp	24bpp	32bpp
PCX	PC Graphics	●	●	●	●		●	
BMP	Windows & OS2	●	●	●	●		●	
Clear	by John Kortink	●	●	●	●	●	●	
PBM	Portable bitmap toolkit	●	●	●	●	●	●	
Targa	Truevision	●	●	●	●	●	●	●
TIFF	Tagged Image Files	●	●	●	●	●	●	●
MacPaint	Apple	●						
IMG	Atari GEM	●						
ColorIX	ColorIX softworks				●			
PICT2	Apple	●	●	●	●	●		●

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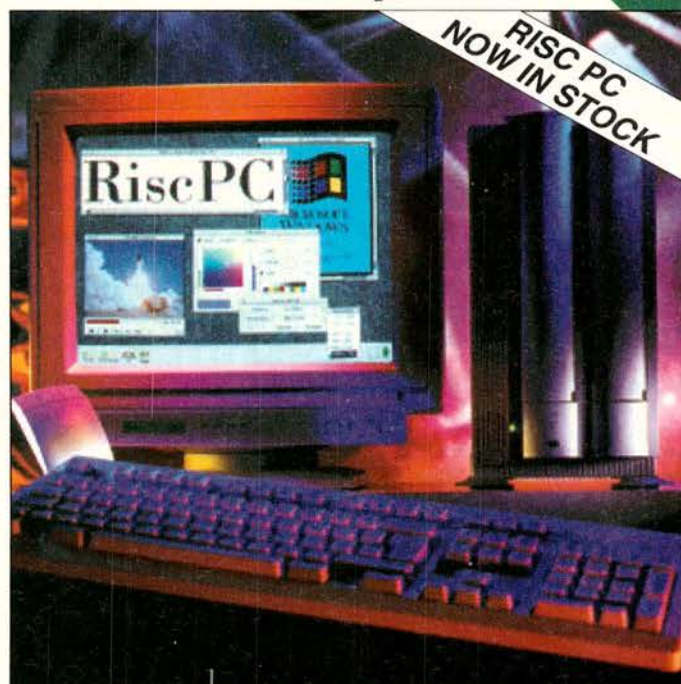
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Acorns that really grow

Terry Blunt discovers how easy it is to expand his new Risc PC

THE physical design of the Risc PC is quite startling and, from an expansion point of view, particularly effective. For those who missed the launch, the idea is that case slices can be added as you need them. This means that you don't end up trying to cram as much as possible into a progressively smaller space.

The slices each carry two front blanks, one 3.5in and one 5.25in for any additional floppies, hard or CD-Rom drives. The slices also have two rear slots for normal expansion cards.

Each slice has a smart roll down front cover which, when closed,

keeps dust, fingers and *things* out of the drives and gives the front a consistent colour, even if the expansions don't quite match the shade.

In a welcome departure from the past, Acorn have not only embraced full expansion of their new micro but have involved third-party developers well in advance. The result is that as soon as you buy your Risc PC you can get the necessary hardware to start expanding it.

Existing cards will work as before and Atomwide can already supply a complete six or eight slot backplane kit to take all the cards you already have and more.

The kit includes all necessary



fittings with one, two or three matching case slices depending on the upgrade you choose. The kit allows DMA to the bottom two slots and has high-speed buffering of both the data and address lines.

The documentation gives step-by-step instructions along with numerous

exploded views, although putting the kit together is a lot easier to do than to describe.

Your first attempt might take you about 15

minutes, after that you could probably do quite major reshuffling in only a couple of minutes without rushing.

However, it's not quite true to say that there are no screws at all. The expansion cards themselves are still fitted with two screws, although there's no more fiddling with blanking plates and T-joints.

PRODUCT SPOTLIGHT

Product: Backplane kit – four slice, eight slot backplane

Price: circa £299

Supplier: Atomwide, 7 The Metro Centre, Bridge Road, Orpington, Kent BR5 2BE.

Tel: 0689 838852

Expanding with DEBI

The DEBI bus or DMA Extended Bus Interface found in the Risc PC makes expansion a dream. Some operations make very heavy demands on computing power and the data bus width has been increased on the Risc PC from the 16-bits – standard on the A5000 and A540 – to 32-bits on the Risc PC.

As the Risc PC can take two single-width expansion cards in its standard configuration, the philosophy states that you'll have two more for every slice added.

Only you know what you'll want to put in these but it is the flexibility that is the key. When you buy a computer you need to be thinking about what you'll be doing in two or five years, the Risc PC's ease of expansion removes the need for this predictive decision making.

The speed of the transfer of data between an expansion card and the

main memory has been increased due to the processor address space which has been expanded from 4k to 16Mb plus the original 4k.

DEBI also supports Direct Memory Access so that data can be read from and written to system ram by expansion cards without interrupting the CPU. This combines to give you a seamless working environment.

The 16Mb address space is known as EASI (Extended Acorn System Interface) space which means that data held on an expansion card in rom or ram can now be read or written to directly without the previous limitation of 4k page chunks.

This greatly speeds up the transfer of data backwards and forwards between an expansion card and the main memory, and will result in some very impressive hardware units being designed.

Summing up

At £299 the upgrade might seem expensive for a high class Lego set but, although it's almost that easy to assemble, there is quite a lot of sophisticated hardware involved.

The backplane itself is a fully buffered six-layer job. You'll have none of the worries of the old Beeb expansions where reliability depended on how many Roms you plugged in. At the top of the backplane are terminating resistors to stop the electrical signals waving about in the breeze.

The case slices have guides to support the backplane throughout its length so it can't physically flap around either. The kit also includes a 100W power supply.

This, and the original Risc PC unit, share the work of supplying all the drives and expansion cards you might fit so there should be no risk of excessive power drain.

HE that hath understanding, let him count the number of the beast, for it is the number of man, and his number is six hundred and sixty and six.

Then some not very nice things will happen ... and finally ...

And there shall be no more anything accursed, and the throne of God and of the Lamb shall be therein, and his servants shall do him service, and they shall see his face, and his name shall be on their foreheads.

And there shall be night no more, and they need no light of lamp, neither light of sun, for the Lord God shall give them light, and they shall reign unto the ages of the ages.

I like a story with a happy ending, especially when the script isn't copyrighted. What do you call the textual equivalent of clip art?

Whatever, it comes in useful when you have some space to fill, which reminds me, TechForum has now grown in size, if not stature – but then you should have noticed that already, unless of course you've never come across it before.

You might say, what's that got to do with Acorn? I dunno, but it got your attention didn't it? Either way, please continue to write in with your comments and programming queries.

Quick on the RISC_OSLib Draw

If you use Acorn's C library of draw functions for rendering draw files, you must ensure you call *wimpt_checkmode* on a mode change, as *wimpt_dx* et al are used by the draw functions.

In my copy of RISC_OSLib the draw file functions didn't support 256 entry palette sprites – luckily I have the library source code and could easily fix this.

If you already have the source, you can make the

same amendments to your own copy and this is what you do. Copy draw files to your source code and change the function:

```
OS_error *do_objsprite(draw_objptr hd
rptr, int orgx,int orgy)
```

as follows. Replace the statement:

```
err = selecttable( . . . );
```

with:

```
if (palentries == 256) {
int colour_int, i;
wimp_paletteword *from = (wimp_pal
etteword *)sourcepal;
char *to = pixtrans;
for (i=256; i>0; i--) {
if (err = colourtran_return_colour
number(*from++, &colour_int), err)
break; *to++ = colour_int; }
}
else err = selecttable( . . . );
```

On a related matter, Draw's support for formatting and justifying columns of text within a draw file can be very useful.

With RISC OS 3 containing some fonts in ROM which can therefore be relied upon to be available, we will inevitably, thank good Acorn, see greater use being made of the outline fonts in place of the old system font.

If you wish to add a page of instructions or some other on-line documentation to an application, draw file's text columns provide a simple way to do this, assuming you use RISC_OSLib to do all the work of rendering for you.

Of course you get the added bonus of being able to incorporate paths, objects and sprites into your documentation as illustrations.

However – I bet you knew that was coming – with around 50 per cent of users still stuck with RISC OS 2, provision must be made for them and that means catering for users who, especially if they have no hard disk, may not always have the relevant fonts available.

They need to be prompted when a certain font is required so they can locate and boot *Fonts* and then carry on as normal, or at the very least need to be warned if a particular font is required and is currently unavailable, so is going to cause problems.

Unfortunately, with formatted text columns in RISC_OSLib, if none of the required fonts are available the text becomes invisible and no error is returned, be it either verification or rendering of the draw_diag concerned.

This makes it pretty difficult to warn the user about the missing font.

The only direct solution is to pre-scan your draw file and locate all fonts used – which means scanning text area objects and decoding font usage information, then checking availability.

This is a serious pain in the butt, to put it mildly, and shouldn't be left for you to do – the library code is meant to take such menial tasks

Here

off your hands.

Now, if you are observant and of an inquiring mind, you will have noticed that when Draw tries to render a text column containing an unavailable font, it warns the user about this.

As we know, Draw was written with a variant of RISC_OSLib, so I hoped that the released RISC_OSLib still contained this code, albeit now hidden.

It turns out that this is indeed the case, though to get at it you will again need to modify the source code slightly. So, beg, borrow or steal yourself a copy of RISC_OSLib's source – try haranguing Acorn – and then cut along the dotted line, like so:

Put *drawintern* in your header files and *drawtextc* in your source code.

Add a couple of global variables to your code:

```
int progame_fontmiss=0;
char progame_fontname[64];
```

and externally declare these in *drawtextc*. Find *drawtextc*'s function:

```
static char *draw_text_setFont(char
*in, font *fonts, BOOL whinge, int
*handle)
```

and locate the statement:

```
if ((err = font_find(name, scaleWid
th, scaleSize, 0, 0, &fontHandle))
== 0
&& fontHandle != 0)
{
.
.
.
}
else
{
fonts[fontNumber] = -1;
}
```

Replace the else clause with:

```
else
{
fonts[fontNumber] = -1;
progame_fontmiss=1;
strncpy(progame_fontname, name, 6
3);
```

Stop me, buy one!

Don't forget, 42 may be the answer, but we have yet to discover the questions. If you have a question, it is your duty to society to write in, so do it NOW.

To: TechForum,
Acorn Computing,
Europa House, Adlington Park,
Macclesfield SK10 4NP.

is wisdom

```
prognome_fontname[63]=0;
}
```

Now, prior to rendering a draw file you should verify it and before doing this set:

```
prognome_fontmiss=0
```

and after the verify, if no error was returned, check *prognome_fontmiss*. If it is 1, then at least one text column font is missing and its name can be found in *prognome_fontname*, which you can read when warning the user.

All your problems are solved, and with only a dozen short lines of code.

Desktop aesthetics

While fiddling about designing some templates the other day I encountered a minor fault with the RISC OS 3 wimp and 3D bordered icons.

You can see this problem immediately if you have a Risc PC or NewLook installed on your system from boot, or if you have done a soft reset after loading NewLook – so that the ROMApps3D templates are present and in use.

Paint will then use 3D bump buttons in its magnifier dbx, which auto-repeat and press in on each repeat, with their fill colour turning yellow as they slab inwards.

Bring up this dbx for a sprite and, ensuring the pointer is not over an icon, press and hold select, then move over one of the buttons and still holding Select, click Adjust – the button stays pressed in.

Without releasing Select, move over another button and click Adjust again – it should also press in. However, if you now release all the mouse buttons, while the last clicked icon reverts to normal the Wimp forgets about the others and they stay pressed inwards.

If you have some other applications which use similar auto-repeat press-in style buttons within persistent dialogue boxes, this can become even more irritating and is

Michael Rozdoba
gives a deeper
understanding of life,
the universe and Acorn

potentially confusing to inexperienced users – come on Acorn, you made this mess, tidy it up.

What with the more serious 3D button problem mentioned last month, which can crash a machine if a window or task quits while a button is still pressed in, it seems as though this code was not tested thoroughly.

LZW – HDI?

Andrew Wood of Whitley Bay wants to know how LZW compression works and specifically, how he can convert Tracker files to Symphony – which according to Oregon Developments uses a customised LZW algorithm.

They won't tell him, and I have no idea, so can you help Andrew out?

I wouldn't bother trying to ask Lempel, Zev or Welch though – they're still trying to patent their algorithm which will be a really popular move, rather like the Tories taxing greed.

Andrew's also having trouble trying to achieve flicker free animation. He's using bank switching synchronised with VSync, but is still experiencing problems when the processor is under a heavy load, playing a music file under interrupts.

Afraid I can't help you here either – I don't know enough about the hardware and how it interacts with the operating system at this low level. I suspect any good demo coders will be able to solve your trouble though, if it can be done at all.

Will anyone care to drop Andrew a line, via TechForum – if you don't

mind giving your secrets away, that is.

RISC_OSLib, again...

If you register a function with *baricon*, to be called after a click on your iconbar icon, it should be passed your icon's handle. It isn't.

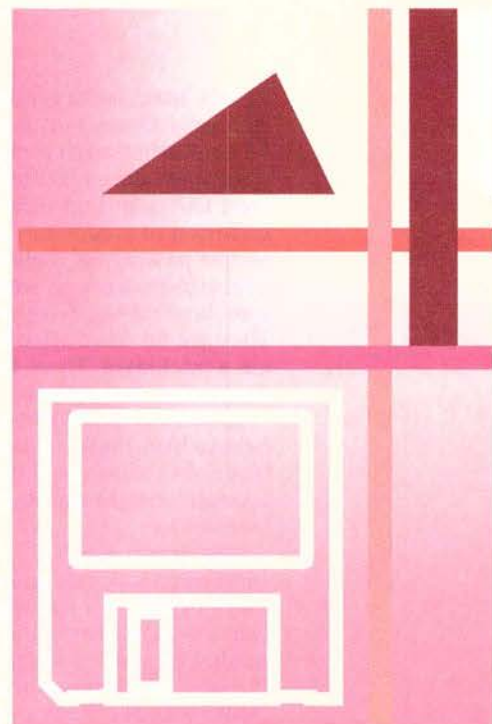
Acorn's code assumes the event data contains a *wimp_caretstr*, when it is actually a *wimp_mousestr* – as a result, instead of getting the icon handle your function is passed the pointer's y coordinate. Not exactly what was intended.

Fortunately this information isn't usually needed, though that's something of a two-edged sword – if this weren't the case the bug would have been spotted and fixed by Acorn much sooner.

To work around the fault, if you only have one icon on the icon bar you can instead remember its handle, as returned by the bar icon function which created it. Alternatively, call *wimpt_last_event* within your handler function, to read the icon handle of the icon that was clicked upon.

Of course the best solution as always is to correct the library code directly, something that can only be easily done if you have its source code, which most people don't.

That's it. I've had enough. Come on, Acorn, outside, now. Chicken?



Easy C

Darren Salt, of last month's TechForum fame, has pointed out that this contains references to a whole host of C++ specific key words. Can anyone explain this?

Incidentally Darren, how did you discover this? Not by reverse engineering I trust. Tsk-tsk, RISC Developments will be pleased.

NOW here's a contentious issue. Surely abstract art is a contradiction in terms? For years now, decent skilled artists have had to put up with the inclusion of completely talentless people passing off their *creations* as abstract paintings which somehow makes them artists. They are no more artistic than I am a bricklayer. There has to be a distinction somewhere.

To actually be a bricklayer I would have to have those particular skills that would allow me to build accurate, straight and sturdy walls, for instance.

How would it be if I announced suddenly and without a hint of ability or training that I am now a bricklayer and please I would like a job on a building site? My walls would resemble those made by Yosser Hughes – a complete mess.

Which is what abstract art is. To say you are an artist means you are distinguishing yourself from those that are not, the same way a doctor is a qualified physician and you or I are not. It's just not good enough *saying* you are something or other – show us your credentials.

Anyone can create an abstract painting. Go kick a tin of paint over a big bit of paper and have it framed. Stick it in an art gallery alongside a few other abstracts and no one knows if you can paint, draw or have any other ability that singles you out as an artist.

Abstract artists would also like you to think that they measure what they create, that they plan a painting carefully and that the

result has nothing to do with serendipity. But you can't tell from the paintings.

You're standing there, looking at a giant meaningless riot of what seems like an explosion in a paint factory and you ask yourself: "Has a child done it?" Or has a bunch of hairy spiders armed with tins of emulsion and nothing better to do on a wet weekend got together for a protracted game of Twister and things have got out of hand (or eight legs).

This argument is not one of taste – whether you like abstract art or not has nothing to do with it. It's just that anyone can make an

or I and your car is now a heap of rubbish – but is it art? Probably.

Which, at last, brings me round to this month's topic (I love chocolate) – the computer equivalent of creating abstract art. Anyone can do it and it's fun to watch. Double-click on the *MAGsdir* icon, then double-click *Abstract* and the first thing you'll see is a blank canvas and eight tools.

Funnily enough, when I was at art college (thousands of years ago) we were all taken to an exhibition where a blank canvas was the finished work, in fact four identical blank canvasses.

Our tutor tried vainly to convince

Abstract art

Mike Goldberg conjures million-pound works out of your micro

abstract painting but not everyone, for instance, can draw your portrait, or paint recognisable landscapes, or anything that requires very skilful eye-to-hand coordination and an innate talent nurtured by years of hard work and practice.

Some abstract artists can actually draw and paint, as well as throw liquids at canvas, but choose to remain where the money's good and the quality of the work is unjudgeable by any human standards.

What would it be like if there were, say, abstract car mechanics? You want your engine stripped down and rebuilt to perfection. The skilled and fully trained mechanic with ability and precision takes your engine to bits and carefully cleans and rebuilds it in a fashion very few can accomplish. Your car is now as good as new.

Now take it to the abstract mechanic. He takes your engine to bits and then lobs the parts back in a random jumble under the bonnet. He's no more a mechanic than you

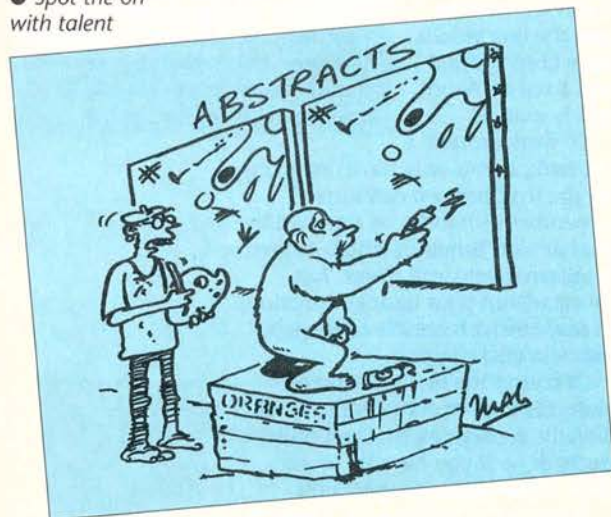
us of the validity and meaning of these abominations as only an art historian knows how. So I asked him that if I was to hand the artist several blank rectangles of paper and call it money would he be happy to accept them as payment for the pictures? Talk about the Emperor's new clothes.

I digress, as usual. A blank canvas awaits your masterpiece and you can activate any of the eight tools in any combinations. Each tool throws paint about in a different way and can be toggled on or off by pressing the appropriate number key, one to eight. There's a row of lights at the top left of the drawing board which indicate the tool's status, active or art student – oh, to be one again.

Tool number four is an eraser so if you start off with that one it will appear that nothing is happening. Hmm...you've created a blank canvas. Mind you, it's been done before so no points for originality there.

Tool eight is a camera which

● Spot the on with talent



grabs random areas of the canvas and copies them to where the camera is. The others you can have fun finding out for yourselves.

As all eight dance over the painting I am reminded of the animated sorcerer's apprentice – a bit bizarre watching ostensibly inanimate objects apparently alive and with volition. Sounds like the Government really.

Watching the eraser rub out a painting can be more fun than the creation of it, but as every budding artist is told, "You should never use an eraser". Oh aye, that's sensible! So if I'm a tailor who sews an arm wrongly on a jacket do I keep sewing arms on 'til I get it right? I might have to sell the finished coat to an octopus.

If you're really not happy with the mess in front of you, press R to restart the whole thing. If you do like the mess press S to save it. Later on you can press L to load up tomorrow's priceless works of art.

At any time you can freeze the action by keeping *Return* pressed. This removes the tools from the screen and only the work is displayed – kind of helping you to see how things are going.

Perhaps I should have stuck an artist's thumb slap bang in the middle of the screen as that is what artist's do isn't it? I've never met an artist who wears a beret, let alone sticks a thumb out in mid-air. Silly hats, yes, pencils held aloft to aid proportion and position, yes, but it's thumbs down for thumbs up!

Well, where has this left us all? There's no doubt that the computer doth make artists of us all in some



● The tools of the trade

ways. Personally, it's the neatness of lettering produced by computers that help my designs and Draw allows for swift repetition of elements in a picture.

For some things it's easier to draw them physically and then scan them in, than it is to render them in a paint package alone. That's okay if you need to be precise and what you're creating has a purpose other than subjective enjoyment.

But for enjoyment alone, well, this program is really an enhanced version of the random triangle program we all typed in from the User Guide with our BBC Micros! Very pretty and kaleidoscopic – and dead easy.

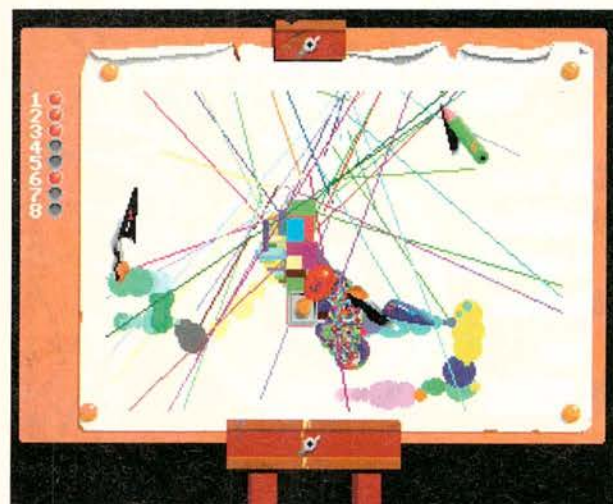
I suppose chance would state that, like the infinite monkeys and typewriters recreating Shakespeare's

plays, it would be possible for this program to draw the Mona Lisa eventually. But that's about as likely as getting a straight answer from a politician.

What I hope it demonstrates is that abstracts can be created by anyone with no skills at all and totally at random, even by a computer. If all someone can create is abstract art then they're not good enough to be called an artist, as this should imply some ability or skill or talent, not just serendipity.

What this program will never do is recreate a work of art similar to those people who really can be called artists like Titian, Rubens, Michelangelo, Leonardo and the rest.

And that's because it's not good enough.



● Serendipity at work

● It covers the canvas – but is it art



DRAW_Changer

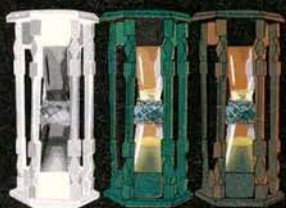
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HAVE it on good authority that there will be about 15 World Cup Football computer games this summer – none for the Acorn though – which may please or distress you depending on your feeling about 25 men running up and down a field kicking a ball.

If you prefer to forget how badly the English, Scottish, Welsh and Northern Irish National teams fared, then perhaps it's time to look forward to the new football season.

League by Alexander Seeley is a desktop application for keeping track of league football results. Just enter the results as they happen and your machine will arrange the clubs into a league table. You can even change the date on the table to see how it looked at the end of any day during the season.

Creating a new table is simple. Simply adjust the number of teams in the league to the required number and enter the names of the teams. Also enter a title for the league, and provide a start date. This is important because you will not be able to input any results dated earlier than this. You can start mid-season too.

For each team enter the games won, drawn, lost and the goal difference. From here it is just a matter of updating the details. You can view the league table as it was at any stage during the season by changing the date at the top of the League Table window.

For anyone who follows a team and can methodically put in the scores each week, **League** allows you to look at the league table for



any date in the season. It also allows variable numbers of teams.

Useful or annoying

Gremlins in your system can be nasty and the one from Alexander Seeley which is not particularly useful lets you type into icons which are not usually writable.

Gremlin is just desktop silly and you can quit at any time via the Task Manager. If you press Control+Print with the pointer over an icon it will place the caret there which – if you have nothing better to do – will let you customise your desktop but not permanently.

Remember Neko the cat? Well, the cute feline has been adapted to create **PuddyTat**. This gives you a replacement hourglass – courtesy of Hourmake by Jon Ribbens of Doggysoft.

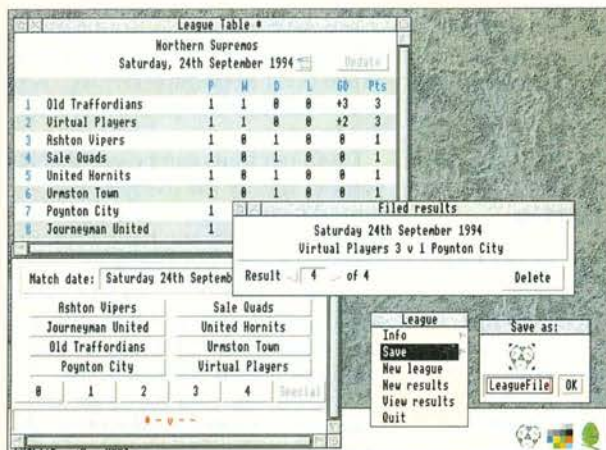
One for cat lovers, but do I really

have to: *Don a suitably hip outfit (preferably psychedelic paisley) and recite classic Leonard Cohen prose, Mr Willis?*

Making decisions

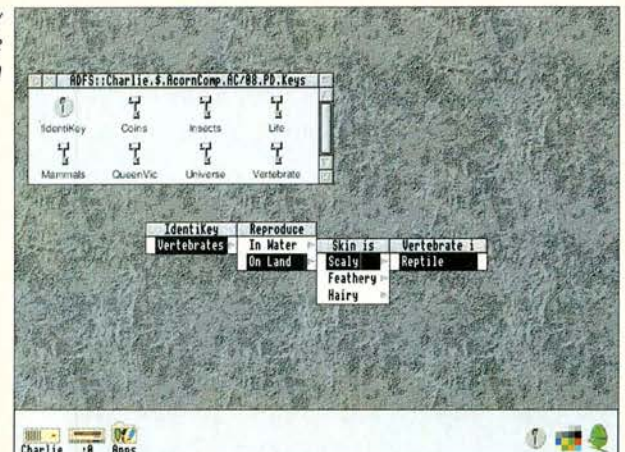
Robert Seago's **IdentiKey** is able to produce, edit and display any data which has a tree-like structure such as a family tree or a decision-making scenario.

The program is very easy to use and though producing your own keyfiles can be a little difficult, this is easily solved if you plan what information you want to make decisions on and what you want



● Keep track of your league

● The key is the solution



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 Naked PD, Fayence, Fulford Road, Fulford, Stoke-on-Trent ST11 9QT.
 Planet PD, 37 Manor Drive, Berrylands, Surbiton, Surrey KT5 8NF.
 Skyfall, PO Box 2220, Birmingham B43 5RZ.
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the final decisions to be.

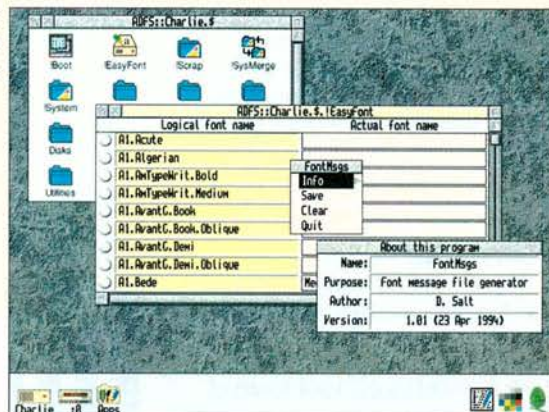
A series of samples are included with the program and you can edit these to see the principles and a help file is included too. To set up a keyfile you are presented with a window and each box in this mode represents a decision box. These can be looked at using the arrow icons.

Each has a feature, such as shape, and decisions can be made about that feature. For instance *Date of birth*. It may be that that decision is a statement which does not need to lead to another box – it gives the

● Mr Flibble strikes back



● Assess, edit and save those font messages



final outcome.

However, the arrows beside the decisions are pressed if you wish that decision to open another feature. Pressing the arrows installs a figure automatically that can be edited. If you find yourself getting lost, press the Roots icon which will display the roots of that box.

This is an excellent tool which will appeal to teachers but equally you can create some fun applications easily and simply. For instance, why not try your hand at a little computer clairvoyance?

They're all dead, Dave

GEM PD has released version two of their Red Dwarf Disk Set. Enhancements include all sound samples which are now in Armadeus sample format, compressed using David Radford's Compress and his Player application is provided on the disks.

The quality of the images have also been improved with all of these now in high resolution format and with the use of scaling methods so that those with low resolution monitors can still view them.

There are some new programs included with a Sound and Graphics demos and Tracker versions of the theme tunes. There is also a Starbug demo and a Holly beep to annoy your friends and colleagues.

If you already have a set of these disks and have registered you can upgrade for £2 when you return the original disks. If you didn't bother to register the fee will be £4. The full cost of the set stays at £10.

Message in a bottle

A RISC OS 3 utility for anyone who gets bored with their system scanning font directories. Using **FontMsgs**, drag your fonts directory – Fonts – to the iconbar and **FontMsgs** will scan the directory.

If there is already a messages file, this will also be read in order to

inform you of fonts added to or removed from this directory. Next, select the default font from each family, edit its displayed name and save.

Newly-included fonts are shown on a cream background and removed fonts are shown in a separate window. You can examine your font list at any time by selecting the **FontMsgs** icon – to look at the deleted list window click adjust.

Another program you might find useful – especially if you don't have or want an up-to-date word processor – is **TextMax**. The latest version of this *text printer maximiser* is 1.07 and works with Epson compatible printers.

This is a utility that allows you to use italics, bold and so on via embedded commands, so that when the printer encounters a specific string instead of printing it, it takes it as a command and obeys it. Fuller information is provided as a text file.

However, the commands provided by this utility are of the form `[[x]]`, so that there is no confusion with possible future Epson codes. For example `[[^]]` gives you superscript while `[[x]]` cancels it. This utility was written by Colin McEwan who in Edit would type his name as `Colin M[[^]]c%Ewan`.

The iconbar icon gives you control over a range of settings: Formfeed, letterhead and a multitasking option which is yet to be implemented. Text can be justified and printing pitches can be set too.

Up to ten fonts can be saved and you can specify the margins and print direction, uni- or the faster bi-directional and if you have a colour printer you can access that too.

The text manual is easy to follow and though Colin uses this program with a Star LC-200, I'd suggest you experiment with settings to see which best suit your hardware and your way of working. Definitely one to keep and update.

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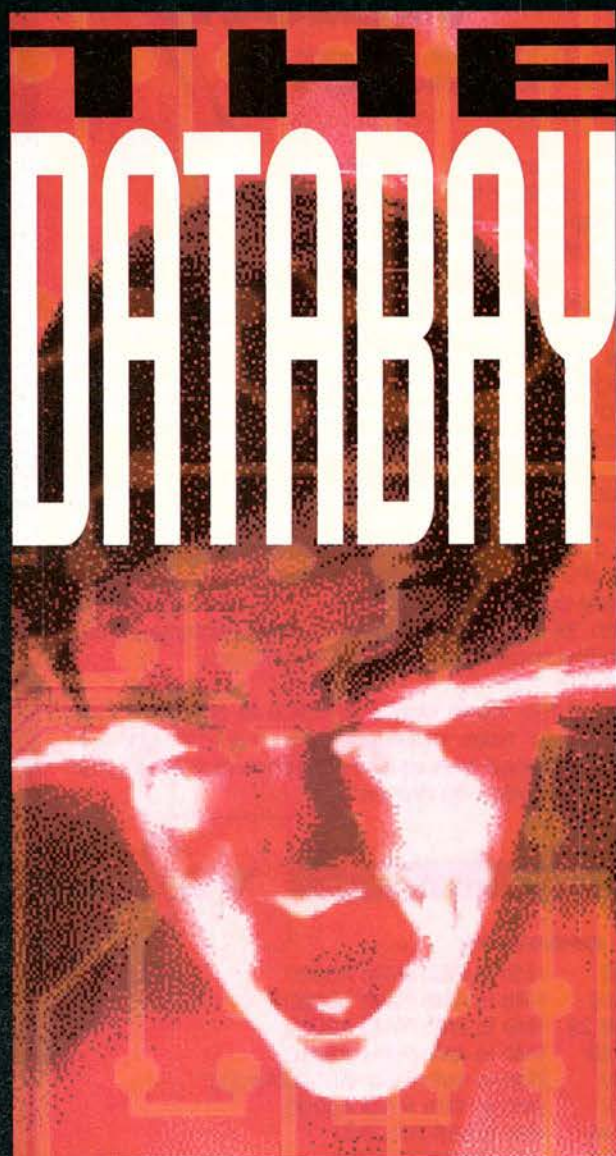
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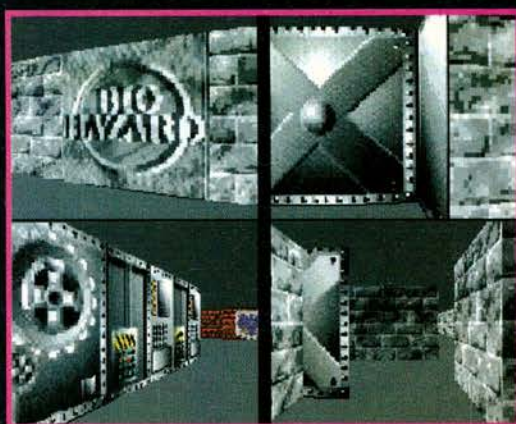


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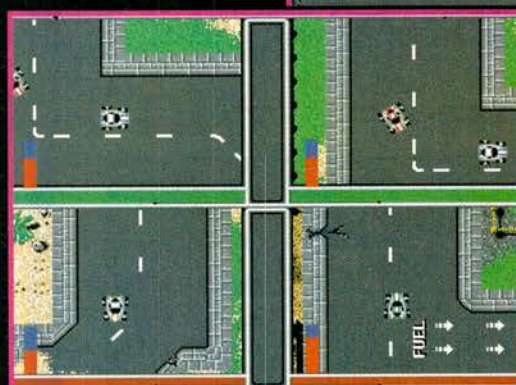
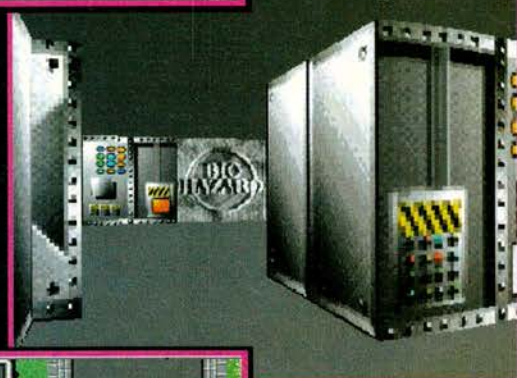
IN the last Databay I mentioned a couple of games being written by Frank Isidor of Fry Up Productions – *High Octane*, an overhead racing game, and a conversion of *Wolfenstein 3D*.

Two months is a long time in the games world, and I've just received some more information. In that time-honoured tradition, here's the bad news first.

Frank applied to Id Software, the team that originally wrote *Wolfenstein*, for a conversion licence. Unfortunately, he's been turned down – they were wanting a totally faithful conversion and the extra features that he was suggesting didn't seem to appeal to them. So there you go, Frank is



● First two player, then four player – whatever next?



no longer working on that conversion.

Now it's time for the good news. I've heard there is a fully accurate conversion on its way, so the purists among you will be able to play the original.

However, Frank's game engine was far too good to waste, so he's doing a spot of rewiring, adding lashings of new graphics and writing a game called *Bio-Hazard*.

You may remember that he intended to include a simultaneous two-player mode in his conversion of *Wolfenstein* – now he's working on his own game, he's decided to increase that to four-player. The remarkable thing is that it should still run at 25 frames per second on an ARM 3 and about 50 on a Risc PC.

Work is still progressing on *High Octane* and those of you with friends to burn will be pleased to learn that this, too, has

been upgraded to a four-player version, which runs at a staggering 50 frames per second on the ARM 2.

True love



While I'm on the subject of new games, here's news of a trio of titles being written by the programming team Machine Love. Shane Suebsahakarn is currently working on *Stryker's Run III*, a shoot-em-up along the lines of *Turrican III* with copious amounts of power-ups, stacks of levels, and Manga-style graphics liberally scattered throughout the game.

If you should fancy something different, you could try another of Shane's games. *Dragon Warriors* is a *Street Fighter II* clone with 16 full-size fighters and action aplenty.

If those aren't enough, he's

been working on a game called *Legends* – a roleplaying game where you must search for a kidnapped prince and slay the scheming Duke who has claimed the throne.

This has lashings of features and a powerful dungeon editor will also be included which uses its own programming language, allowing you to make your creations unique.

These games – all Risc PC compatible – should be ready for Christmas – I'll give you more news nearer the time. However, I should mention that Shane has a fistful of other big products waiting to be written, so watch this space, as they say.

Triax in trouble



If you have followed the advice so far for Exile, you should be standing just above Behemoth Tunnel, with the RCD resting on a pressure-sensitive pad.

Fly along Behemoth again, collecting the urn in the process, and head right until you come to a red bush in Yarrow Tunnel. Just in case you were considering it, don't touch the bush – it's highly dangerous.

Fly upwards to Artesian Cave and fill your urn with water – there's another fire to be extinguished.

Retrace your steps and fly to Puck Cave, the one you could see when you were in Artesian Cave.

Drop the urn next to the gap in the wall and lie down to push it through. Turn round and shoot between the wall and the door so that the nest explodes.

Turn around once more and shoot the urn through the rest of the way. At this stage, you'll have to find Fluffy, one of the Pericles' crew. He should be in one of the mushroom-filled tunnels nearby, so fire a couple of shots to attract his attention and wait for him to come to you.

Go back to Puck Cave and throw Fluffy through the gap, shooting the button so that you are pushed inside as well. Place him near the button, then go down the secret passage and wait until Fluffy knocks it.

Once inside, collect the pass and press the button. Throw Fluffy through the gap again and leave the urn in the red bush to the right of Yarrow Tunnel.

Collect the RCD once more, and find a small room with a door that closes when you step near it. You can now open the door with your RCD and wander inside to collect all those energy pods that are raining down on top of you. If you found this room earlier, congratulations – I just hope you're not short of energy now.

Teleport back to Eriadnus and arm your icer. Shoot the pink table into the lower tunnel on the left and attack the robot beyond.

While the robot is flashing, shoot or push it into the transporter and use the door to

push the table in after it.

They are whisked away to a cave in the Waters network, where the robot will recover and kill two white birds that would otherwise annoy you later.

Enter the tunnel just below the one containing your table. A robot will begin to shoot heat-seeking missiles at you. Attack him until he's stunned, then shove him off the edge.

Now you can unlock the white door and teleport away when the burger turns round – one shot from that would eradicate you. After it's released a couple of shots, you should see an object bouncing around.

This is the jetpack booster and you'll need to collect it with care. If you hear a transporter, your booster has been teleported to Sarawak Cavern, so you'd better get after it.

Disk full

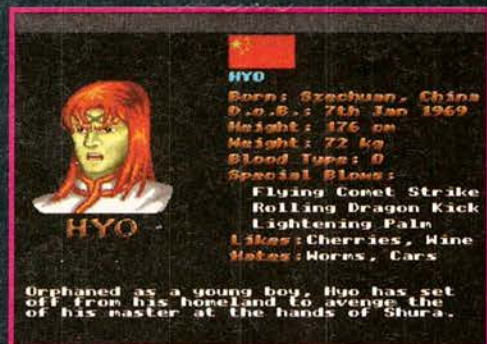


Well, that's all I've got time for – please keep sending in your news, views, hints and tips to the usual address. I'd also like to invite any games programmers out there to tell me about their latest masterpieces.

If you want your work to be seen by a wider audience, write to me and I'll pass on the news. I'll try to dig out a few hints for Flashback for the next Databay so until then, bye for now.

You can write to us at the following address:

The Databay,
Acorn Computing,
Europa House,
Adlington Park,
Macclesfield
SK10 4NP



● Machine Love's current projects – with more games on the way



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Playdays – save £6

THIS is the first education product from GamesWare and will be released under their SkillsWare label. For children under five the BBC TV program Playdays is popular for its educational content and creativity and its themes and characters can now be seen and enjoyed on the Archimedes and Risc PC machines.

Playdays features all the popular characters from the TV series with 13 different games and puzzles and the Why Bird as your friendly guide and tutor.

More than 250 worlds and pictures are divided into groups based on the alphabet, encouraging the development of counting, word recognition, reading, spelling, logic, reasoning, memory, observation, coordination and shape and colour recognition.

Playdays can be used successfully at home or school with a teacher/parent control panel and set of comprehensive teacher's notes.



These offers end
30 September 1994

Order Form

Please send me copies of Playdays. Normal price £25.99 – Special offer price £19.99 plus £2.40 postage and packing.

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Oak Recorder 2 – save £8

HAVE you ever wanted to add sound to your system? Oak Recorder has been around for a number of years and its cost and ease of use has made it a vital part of a host of education programs.

With the recent update to the SoundLab software, Oak Recorder provides sound sampling with 100 per cent compatibility with the Risc PC.

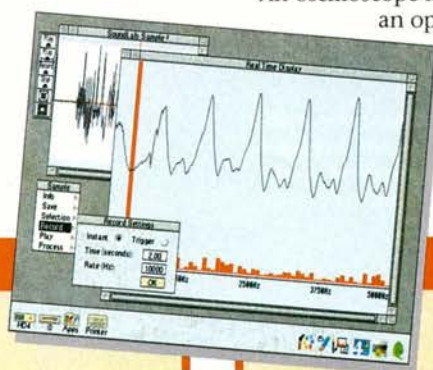
The new version of SoundLab can process samples to match the increased sensitivity to high frequencies, giving much better reproduction of 10kHz sound samples which can be applied to both new and existing samples.

The interface simply plugs into the parallel printer port. You can plug a microphone – which comes with the product – or a hi-fi or CD player into the interface, allowing you to record 8-bit samples between 4 and 10.5 kHz.

This is displayed and can be replayed at varying rates or sections can be marked for deletion, and may be copied or moved elsewhere in the sample so you can create special effects.

An oscilloscope mode shows the sample wave form and there is an optional fast fourier transform in real time. This can be used to examine an existing sample or display the information coming into the microphone.

You can save your samples in Armadeus format for use in other programs or as relocatable modules providing voices for your own Basic programs.



Order Form

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Name

Address.....

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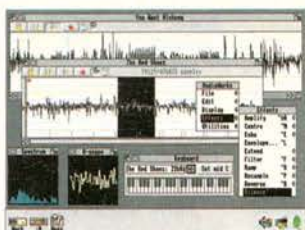


Eagle M2 — *soaring* to great heights



Eagle is the new do-it-all multimedia system for Acorn computers. It can handle a wide range of data types, combining the ability to capture sounds, still pictures and movies. The advanced hardware is accompanied by some of the best software available for manipulating data from all of these sources.

- Greyscale and full colour (8, 16 and 24 bit) *real-time* video digitiser.
- ScanLight greyscale image processing software
- Stereo audio capture and playback
- AudioWorks audio processing software
- Audio mixing of Eagle and computer sound with mixer software
- Audio control software for linking arbitrary desktop events to any sound
- MIDI in, out and thru (Acorn MIDI standard compatible)
- Acorn !Replay compatible movie capture
- Acorn !Replay movie compressing software
- The amazing Eidos real-time movie capture software
- !TakeTwo video application supports live video in a window on the desktop



"This superb interactive sound and vision card has set a new standard for others to chase... an essential creative powerhouse for the artistically inclined... it looks set to be one of the highlights of the year". **Acorn User.**

"Results obtained with it are superb... Eagle does so much, so well, for such a modest outlay that it will take some beating. In short, Eagle comes highly recommended". **Archimedes World**

Price: £329 + £6 carriage + VAT (£386.57) including the Eidos software.

Consists of one standard size expansion card, suitable for all machines that accept this size expansion card, including the new Risc PC. RISC OS 3.1 and a minimum of 2 MBytes required (ARM3 and 4 MBytes for movie recording and sound output).

Further details are available from Computer Concepts on request.

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COMPARED with the PC and Macintosh markets, CD-Roms for the Acorn platform are still relatively few on the ground. However, this situation is rapidly changing with new titles appearing almost monthly, the latest of which unexpectedly comes from the Hampshire Microtechnology Centre.

The Usborne Exploring Nature CD-Rom for Key Stage 1-2 (primary) children aims to provide learning experiences involving exploring a range of natural habitats to discovering hundreds of different species of flora and fauna by looking, thinking and doing.

The program depicts an area of mixed topography in which native flora and fauna can be found in their natural habitats. The idea is that children explore these habitats in order to discover the inhabitants.

Children's discoveries are further enhanced by the use of a

Naturalist's Toolbox with which all manner of measurements of the environment and its inhabitants can be taken, evidence and specimens collected, photographs taken and notes written in a notebook – all good fieldwork skills being

practised without even leaving the comfort of the classroom.

The package comprises a CD-Rom and an A4 ring binder containing instructions, ideas, cross-curricular links and uses in the classroom situation. The CD-Rom is, in essence, a vast collection of visual and textual data which is accessed via a superbly child-oriented front-end.

You start in the study of a country house. From here clicking on a doorway, window or painting will set you off exploring the country side. However, inside the room certain hot areas provide access to

The great outdoors

Chris Drage sets out on a journey to discover nature

interactive help, a scrapbook of travels, themes to explore and a word processor for reporting.

The countryside can be explored in many ways although initially it is fun to follow the paths and tracks exploring the area. The toolbox is always available from which all manner of measuring/collecting equipment is accessible: From dampness meter to soil pH tester, specimen bags, sun meter and rain gauge to mention a few and naturally, a map and camera.

Opening the OS map reveals the whole region in which specific locations can be visited by clicking on marked locations. At each location there are hidden hot spots which reveal close-ups of individual species and hidden signposts that lead you on.

There are no clues other than visual ones presented naturally in each scene, thus successful exploration depends on a combination of common sense and informed guess work.

Returning to the study/bedroom, budding naturalists can study secondary evidence by themes and topics available via books and so on in the room. They can then write a report about what they found out.

In addition, a traveller's atlas awaits discovery in the bedroom/study from which a selection of exotic animals and plants from all over the world can be discovered and information gleaned about each one.

In use the software performs

consistently and intuitively and once it is understood that Adjust always takes you back, can be managed by quite young children.

The accompanying teacher's pack includes explanatory notes and a user guide, and National Curriculum links with the input from the Hampshire Micro Technology Centre is only too obvious here.

Summing up

The designers have done an excellent job in creating a colourful and inviting scenario which positively invites exploration. I am pleased to see a departure from the encyclopedic approach favoured by so many CD-Rom developers in which resources are presented on a series of card stacks. The activity-based exploratory approach in which children travel in a metaphorical environment has much to commend it.

Children emulate the process of scientific discovery using both primary and secondary evidence. Background information is there in abundance as is the opportunity to export all data to children's own presentations. The RISC OS multitasking is preserved and all resource files are easily transferrable to other applications.

The range and depth of information presented about each species is succinct and admirably suited to the target audience. A problem inherent in CD-Rom-based information is that there can be too much.

With Exploring Nature the balance seems about right. Children are encouraged to look up detailed information in reference books. There is one major omission though – sound.

How much better this silent application would be with the addition of bird song, wind, wave and other country sounds. It seems extraordinary when you consider how we encourage children to use all their senses in field work.

This criticism apart, for either home or school the Usborne Exploring Nature CD-Rom is clearly a winner, providing as it does a complete resource available for a wide range of uses within the primary curriculum.

PRODUCT SPOTLIGHT

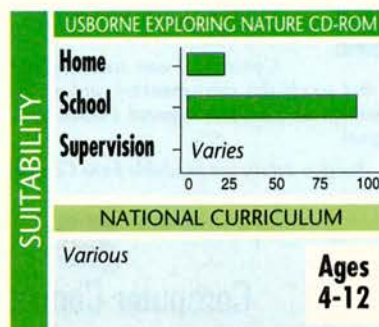
Product: Usborne Exploring Nature CD-Rom

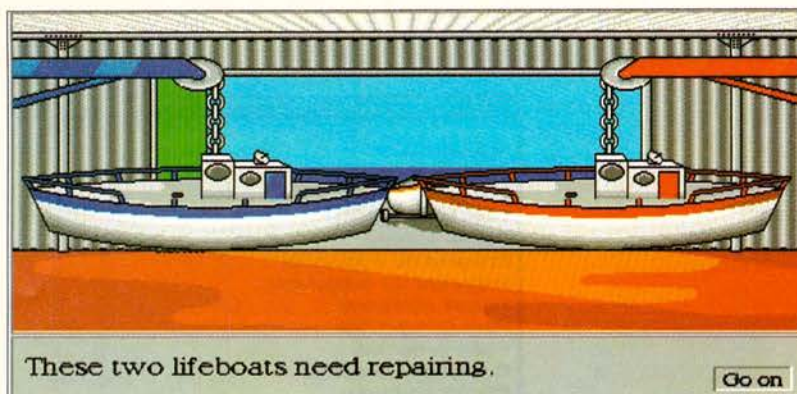
Price: £125 (site licence)

Supplier: Hampshire Microtechnology Centre, Connault Lane, Paulsgrove, Portsmouth, PO6 4SJ.

Tel: 0705 378266

Requirements: CD-Rom drive





● Your introduction to the world of sea rescue and fractions

FOR years many primary school teachers have been dogged by the simple question, "Why do some children find fractions so hard?" This software provides no answer to that question but it does offer a great deal of help. Designed by Adam and Sue Hosler, Sea Rescue is an attempt to use powerful computer graphics and animations to help us all to understand fractions that little bit better.

We begin with a very strong storyline with two children helping to repair life boats in a seaside village. As the story develops we are introduced to the local lifeboat crew. These characters are superbly politically correct.

Let me just say that they could not have been more so unless we had been privy to their sexual orientation. This may seem a flippant point but it is very important that our children see positive role models for all racial and sexual groups.

Here it is carried off with such grace that I didn't even notice, until I suddenly realized that my lifeboat was being skippered by an asian lady clutching a bag of buns from her husband's cake shop. These little points are important and Sherston covered them very well.

A roller-skating robot adds a little light relief to the plot and serves to move the plot along. All difficulty levels of the adventure start with

the children being asked to estimate half a pipe which will be used to repair rails and masts on two lifeboats. The animation on this section is wonderful. Watch out for the lifeboat man/woman who bangs them into shape with bare hands.

Even at this stage an observant teacher can see that the whole screen is reinforcing the concept of the two halves of a whole. Later tasks include cutting glass from large sheets for port holes.

This is a beautifully graded exercise where the concept of numerator and denominator are introduced without a single mention of either word.

Further tasks become slightly more complex until the story line demands that the two children, Mrs. Singh and the robot have to sail off to rescue a sinking ship. A log of the rescue has to be kept and finally the children return home to critical acclaim.

During all the exercises time is given to clear any explanation needed before the children are asked to use their skills. Each exercise moves along logically and, should the child make an error, the program attempts to clarify the question and make the task more understandable.

This is quite often attempted with mathematical software but often the result is poor. Here we have software that really does help

the child to understand.

We are not just given another chance to get it wrong but the task is explained and clarified in a way that allows the child to feel they have accomplished something.

The software to configure in that difficulty level and amount of practice can be controlled. At the simplest level children will deal with halves, thirds and quarters while the highest level includes work with halves down to eighteenths.

Volume and monitor types can be changed if necessary and the start and stop points within the story can be set up by any teacher who wishes

PRODUCT SPOTLIGHT

Product: Sea Rescue

Price: £29.99

Supplier: Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire HA1 2AG.

Tel: 0666 840433

All at sea

Graham Keeling examines a new solution to teaching fractions

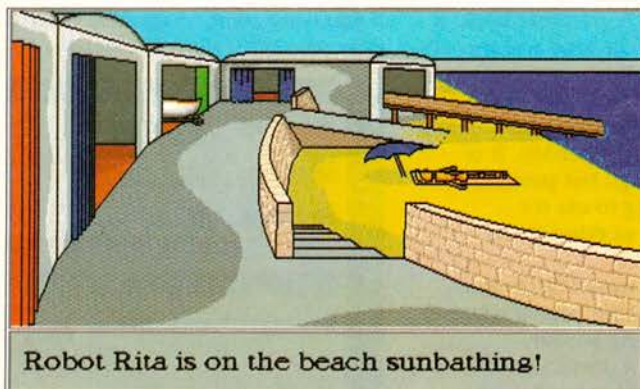
a group of children to visit a particular skill rather than go through the whole plot.



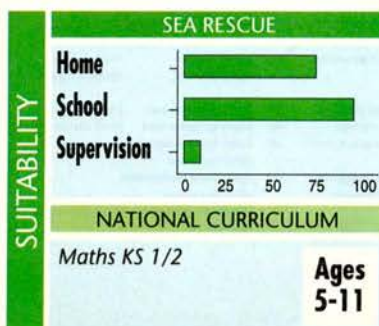
Summing up

Sea Rescue comes with a simple manual which explains how to set up the options and also how to save and print screens. There is also a set of work sheets which follow up the on-screen exercises. The answers to these are thoughtfully provided in the manual.

All in all, Sea Rescue is a fine attempt at using technology to help children understand what fractions are and how they work. It is simple to use, well designed and should find a home in any primary school.



● At the moment all seems calm...



FRENCH verbs are the wall that many a potential linguist has failed to climb. Surely any piece of modern day technology which could take some of the misery away from all those different tenses and irregularities had to be worth a look.

Conjuguez runs from floppy or hard disk but uses a key disk protection system. This must be present when the software is first loaded. After this a French flag icon appears on the icon bar.

All the screens within the software are nicely presented using outline fonts, although I found the size of most of the text a little small

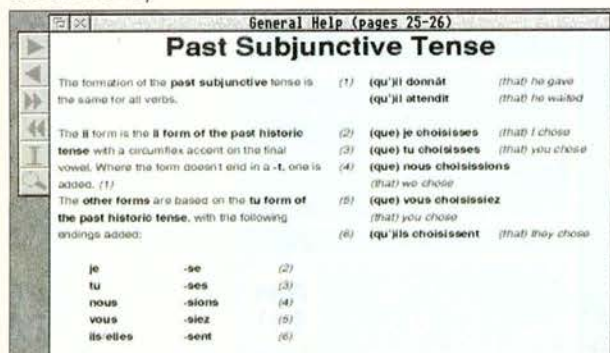
Battle of the verbs

Conjuguez versus Geoff Love in a French showdown

to read clearly on my poor old, non-multisync monitor.

The teacher must first select one of nine levels to work at. These range from *avoir* and *etre* and a few regular *-er* verbs to a general file of 3,500 verbs for A-level candidates. Once complete, clicking on the Conjuguez icon will display the

● A sample of the on-line help



● Lots of tenses to choose from

Temps grammaticaux		
	Actif	Passif
Présent	☒	☐
Imparfait	☒	☐
Futur	☒	☐
Conditionnel	☒	☐
Passé simple	☐	☐
Présent du subjonctif	☐	☐
Imparfait du subjonctif	☐	☐
Passé composé	☐	☐
Plus-que-parfait	☐	☐
Futur antérieur	☐	☐
Conditionnel passé	☐	☐
Passé antérieur	☐	☐
Passé du subjonctif	☐	☐
Plus-que-parfait du subjonctif	☐	☐

main screen. Before starting, choices can be made about the tenses which will be used. Any combination of 14 can be used and all can be in active or passive forms.

Once the game is started you are presented with a verb, a person and a tense – *etre*, *temps present*, *tu* and so on. You have to type in the correct form of the verb to satisfy the criteria.

A candle can also be set to appear and this can be used as a timer. It gradually disappears before your eyes as you desperately try to remember that verb ending.

A bar down the left side of the window contains accented letters. Clicking on any of these will insert them into you typing. Alternatively, the function keys can be used, although no keypad is provided.

Once you have entered the verb, pressing Return will either reward you with a big green tick and the next question or a big red cross. If the latter is true you can go into the Help system.

Conjuguez has a very comprehensive system of almost 100 screens of information about French verbs. In fact, it is just like opening a French grammar book. It is indexed by tense type and there is also a search facility.

A brief summary is given of the tense together with how different verb types behave. It is certainly thorough but possibly not very inviting to use for younger pupils working at the lower levels.

A nice touch would be for it to open at the relevant page if selected following a wrong answer. Unfortunately, it doesn't do this and there are many pupils who

wouldn't bother searching for the correct page every time.

The main problem with Conjuguez is that it soon becomes incredibly boring. There is no actual goal. The verbs just keep on coming. You can, of course, choose to stop at any time and can also display your score in the form of a bar chart showing your relative success or failure at each of the tenses attempted. However, I can't see many sticking at it for long.

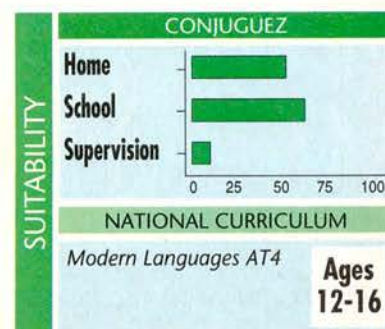
It's a shame because the help section could be really useful if it were accessed automatically. The problem is – and it's been said many times before – if you present something as a game, it's got to be fun. And, after a short while, this isn't.

Summing up

If the game aspect of the software could be improved to retain the users interest for longer this could be a winner. The help section contains everything you need but needs to be linked to mistakes to make it more accessible.

One 16-year-old tester said she thought it would be useful but didn't know how long it would hold her concentration. I thought this was fair comment.

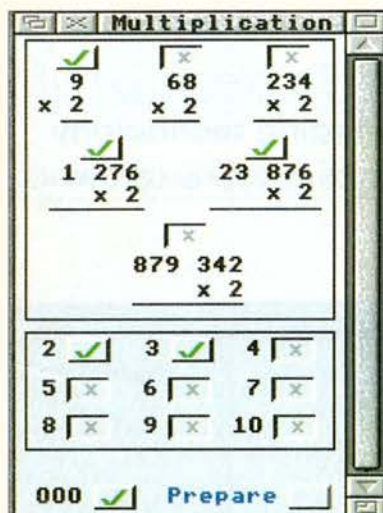
However, Conjuguez could fit the bill if you want short, sharp verb revision exercises – either at home or at school.



THERE is a lot of education software on the market, but nearly all of it is for use by the pupils. Hardly an earth-shattering observation but it does make you look twice when you see a utility for the teacher which will hopefully make life a little easier.

The sole purpose of Maths Card is to produce maths worksheets covering basic numeracy skills spanning Key Stages 1 and 2. Areas covered are: The four rules – whole numbers and fractions, magic squares, and the four rules again – this time involving metric units.

Maths Card installs on the iconbar in the usual fashion. The



● Make your choices...

package will only run from the original floppy or from hard disk, with the original floppy acting as a key disk.

One major annoyance when running from hard disk is that if you forget to insert the original floppy it locks the machine up. As a result I am now typing this review for the second time having lost most of it when trying to load Maths Card without the key disk.

Once you click on the icon the main Maths Card menu screen appears displaying the available sum types. From here you select the type required, addition, subtraction and so on. You are then taken straight to

a screen showing the empty card on the right and a preference window on the left.

Preference windows are different depending on the type of sums you have chosen to create. They allow you to alter the level of difficulty, for instance. With subtraction sums you can opt to use numbers of one to six digits, or a mixture, and whether none, all or some of them should involve carrying.

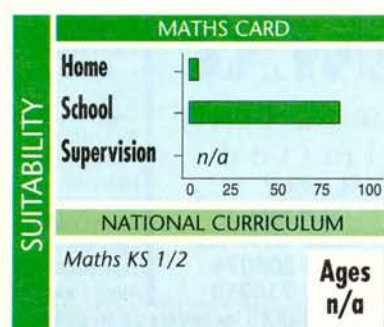
Some screens, such as those for preparing fraction sums, offer even more choices. Basically you can easily create a sheet of sums covering closely targeted skills.

With your choices made, clicking on *prepare* will use random numbers to generate a maths card using your selected criteria. The card is displayed on-screen leaving room at the top to enter details such as date, National Curriculum Attainment Target and Level.

Global options exist which allow you to decide upon certain aspects of presentation, such as whether the sign should appear to the right or left of the sum. Worksheets can therefore be presented to the children following your own school's preferences.

Clicking on *save* will automatically save the card as a draw file. You then select *with answers* and re-save the card to act as a marking sheet. One disappointment is that cards cannot be printed directly from Maths Card – they must first be loaded into Draw.

I feel that this software has



Mathematical assessment

Geoff Love creates maths challenges for his class

missed one major opportunity. With this aspect of maths being so clearly defined in terms of matching tasks to National Curriculum targets and levels, I would have thought it possible for the software to automatically calculate the Attainment Target and Level from the options chosen.

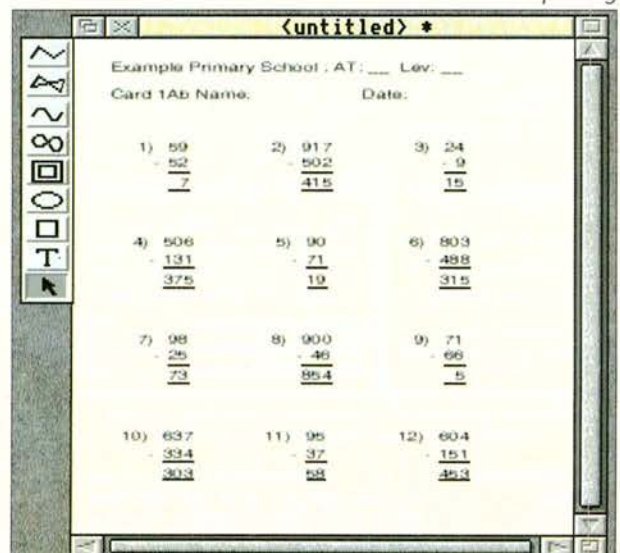
It is certainly possible in theory and could be a real boon to teachers using this system.

Summing up

If you are a teacher who has a need to produce exercises targeted to specific maths areas, this application will undoubtedly save you a great deal of time.

If it were possible to add automatic National Curriculum referencing and its own print option, that would be the icing on the cake.

● A finished card loaded into Draw for printing



PRODUCT SPOTLIGHT

Product: Maths Card

Price: £24.95

Supplier: Creative Curriculum Software,
5 Clover Hill Road, Savile Park, Halifax
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Weather, it rains or shines

Mike Cook drops a drip in this, his latest Body Building project

SUMMER in England, the sound of leather on willow, the smell of new-mown grass and the incessant drip drip drip of the rain. Well, as I write this we have had the summer, last Monday, and are back into the rain. Contemplating the rain I thought I would try a project that I have been meaning to do for some time, to investigate the dripping of a tap.

Now if you have read James Gleick's book *Chaos* you might remember the story of Robert Shaw. He was a physicist at Santa Cruz investigating the new science of chaos.

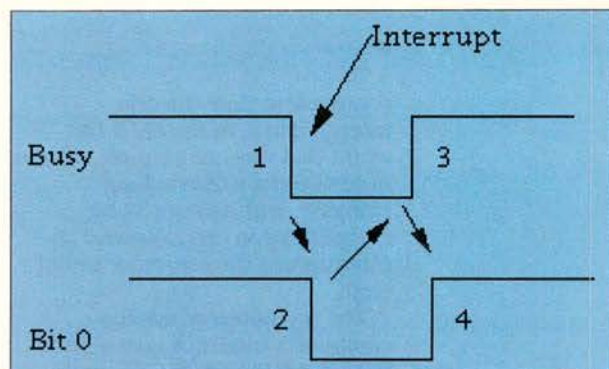
He was looking for a simple example to investigate and came across the idea of a dripping tap, such a simple idea to comprehend at the lowest

level but extremely complex to model.

Let me explain. Imagine a drop developing on the end of a tap, the drop grows and the battle between gravity and surface tension develops, forcing the drop into an ever-changing complex shape.

Eventually the drop stretches so much that gravity wins and the drop breaks free. Some of the water does not escape with the drop but is pulled back by surface tension, vibrating a little like a spring.

If the speed of the build-up of drops is slow this vibration dies down before the next drop develops fully. However, if the drip rate is high enough the vibration can affect the size of the following drop. This is because it could force a drop



● The events: An edge-triggered latch between the photo detector and the computer, the beam is broken and resets the latch

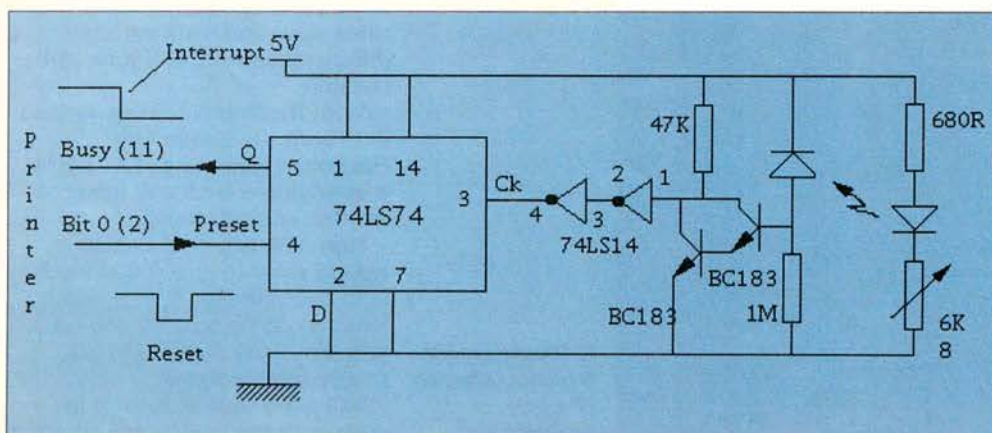
off early or hold it on just that bit longer – it's almost impossible to calculate which it will be.

Chaos inherent in the system

Now here we have the recipe for a chaotic system and perhaps the lurking of a strange attractor. The information we need to gather from this system is quite straightforward, simply the time interval between drops.

This could be done by letting the drop fall on to a microphone or by breaking a light beam. Due to the potential problem with splashing I decided to try the photo-electric approach.

That's only half the battle because we have to get the



● The electronics: A 74LS74 edge-triggered latch and infra red emitters and detectors



computer to time the drip interval. Now, in the old 8-bit world that was quite simple, all you needed was a software loop. However, with today's 32-bit computers you can't suspend all interrupts or the computer would crash.

The solution is to use the computer's interrupt system itself to perform the timing. Again this was quite simple in the 8-bit days. There was a single memory location that contained the address of a routine to be executed when an interrupt occurred.

All you had to do was to put the address of your machine code routine in that place and it would be executed every time an interrupt occurred.

This is basically what happens in the 32-bit machines but the process is more refined. There are a number of memory locations reserved for different kinds of interrupt – these are called vectors – and now instead of simply storing your routine address in these locations, you have to call an operating system routine to *claim* the vector. So I looked round for a vector I could hijack for this project and came up with the BUSY line from the printer port.

When you claim a vector you also pass to the routine a single value that can point to your own storage location. In addition, when

you use the BUSY line you also get a pointer to the printer port hardware.

Interrupts come in two flavours: Edge-triggered and level-triggered and the BUSY one is level triggered. That means that as long as the line is held low it is interrupting the computer. This means that our interrupt service routine has to remove the low level on the busy line before it can end.

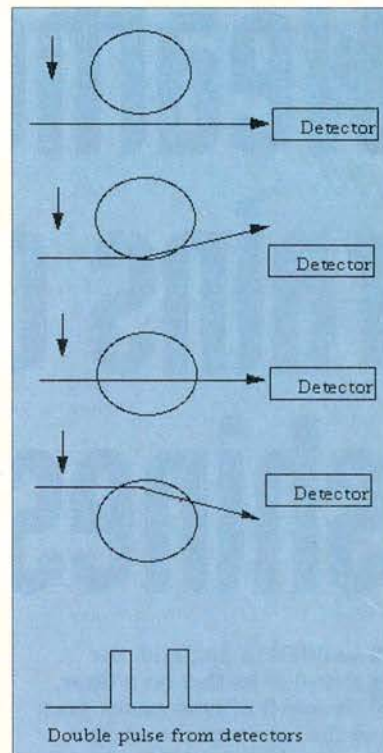
If we simply connect a photo electric sensor to the busy line we would have to wait in the interrupt service routine until the drop has passed.

This is not such a good idea because while the computer is in our routine it can't respond to any others – the rule about interrupt service routines is get out as soon as you can.

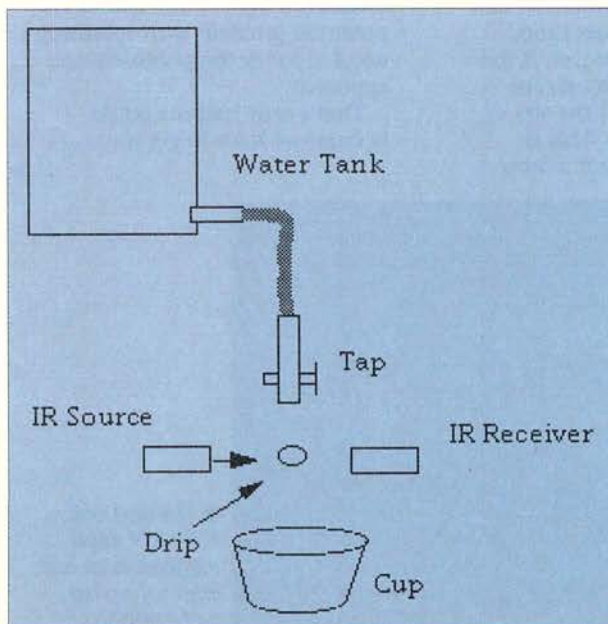
Therefore, I used an edge-triggered latch between the photo detector and the computer. The breaking of the beam reset the latch and the interrupt service routine used one of the printer port lines to clear the latch.

Busy interruptions

Now this is not the whole tale because we have to get the interrupt service routine to time the drips, and here's another problem. There is an interval timer in the IOC chip – T1 – that is not used by the system but this is only a 16-bit timer and it decrements so



● Try colouring the water to increase the reliability – whoops



● The mechanics: A curious collection of mostly mundane items

fast that we would not be able to get a long enough time.

On the other hand there is the centisecond system clock but unfortunately this would not give sufficient time resolution for our experiments.

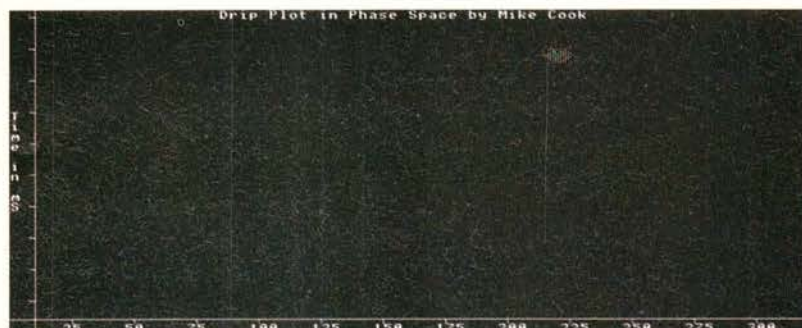
The solution is to claim another vector and use the hardware timer to make a 1mS timer. What that does is simply increment a memory location whenever T1 times out. If we load it with the right number to begin with we will get our 1mS timer.

Then all our interrupt service routine has to do is get the current timer value and work out the difference between this time and last time.

With the overall strategy worked out I built the system, the electronics consisting of a 74LS74 edge-triggered latch and infra-red emitters and detectors.

Normally you need a small resistor value to give you as much light out of the diode as possible. However, as we are trying to catch rain drops, too much light will swamp out the signal.

So I put a variable resistor in series with the emitter and adjusted



● Slow drips

it so the photo-cell would trigger with no interruption. The output from the Darlington amplifier needs sharpening up before you can send it into the latch, so I put it through a couple of Schmitt-triggered inverters. If this is not done you can get oscillations as the threshold point is reached.

Constructing the mechanics

The mechanical arrangement was made from a strange collection of items: An eye dropper, needle valve and Winchester jar provided the basis connected together with tubing from a home-brew kit.

You can get a cheap needle valve from a scrap carburettor and maybe even use the float valve to keep a constant head in the water reservoir.

With that little lot sitting next to my computer I kept getting very strange comments from visitors, especially when I tried food colouring and dyes in the water.

I tried colouring the water to improve the reliability of the signal but to no avail. What happened was that in the most reliable position, instead of getting a single pulse for each drop I got a double one. A few moments thought will show why.

As the drop first touches the beam it is refracted above the sensor, then the beam goes straight through the drop to the sensor. Finally as the drop leaves the beam it is refracted below the sensor.

I was able to prove that this was happening by moving the sensor further away from the tap. Here the drop was moving faster and therefore the pulses were closer together. In fact, I could have used this arrangement for measuring the velocity of the drop, but that would be another project.

The way round this problem, for



● The strange attractor?

this project, was to detect if the time interval was less than 10mS. If it was the software would ignore it.

Analysing the results

So how do we use these timings and what do we see? Well essentially, the series of timings is a one dimensional stream of data and we need a technique of revealing any higher dimensional information contained in it.

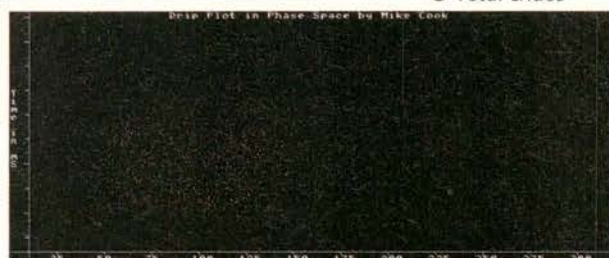
Here we have the concept of *phase space*. On say the X axis, we plot the time between drop 1 and drop 2 and on the Y axis the time between drop 2 and drop 3.

This is repeated so that the time between drop 3 and drop 4 is plotted again on the X axis and so on. This can be extended over as many dimensional axis as we want.

If we do this with a slow steady stream of dots the results should not be too exciting, in fact all drops will plot to a single point. In practice there is a scatter or noise signal. It turns out that this arrangement is very sensitive to vibrations and makes a super-sensitive seismometer.

Sitting on my bench next to my computer, with its hard disk whirling the vibrations smeared the readings. For best results you should try a solid ground floor or try and decouple it by balancing it on a half inflated car inner tube.

When the drip rate is increased you can get a period doubling. Here



● Total chaos

the graph should look like two dots – higher drip rates reveal strange attractors and still higher ones degenerate into chaos.

The machine code section of the software multiplies the time measurements by four to allow the plotting section to simply take the readings and use them as X and Y values to plot.

Each time a point is plotted on the screen its colour is incremented, indicating the points that have been visited more than once. The screen dumps show various stages towards chaos. I think this will vary with all sorts of parameters, not least the shape of the tip where the drip forms.

This is a project with a lot more work to do. As well as trying to eliminate the noise it would be interesting to see if I could find any evidence of a three dimensional attractor – perhaps by using my windmill stereoscope. If I do I'll tell you about it some time.

See you next month by which time – as it will then be the end of summer – it might have stopped raining.



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We compare them and give you the results.

- PhotoDesk
- Photo Touch
- DA's Picture
- Studio 24

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In addition to the best informed views, comprehensive coverage of new education products and the latest in high quality software, next month's *Acorn Computing* includes:

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A-word for it



WHY is it that Acorn still insist on using the old A Archimedes logo on certain icons such as System and Scrap folders and on the obey, absolute, module file icons?

Acorn saw fit to drop the Archimedes logo from the task manager icon when RISC OS 3 was introduced. Now with three versions of the operating system released since the Archimedes logo was last used on an Acorn computer, the introduction of the new generation of Acorns, the release of RISC OS 3.5 and the NewLook desktop, surely they could have come up with something different for the system file icons.

Is this just an oversight by the Acorn developers or have they left them as a nostalgic reminder of past Acorn computers? If the latter is the case, perhaps they should replace the BBC rom file icon with the BBC owl logo.

On another point, does using the Risc PC in a tower configuration put extra stress on the disk drives? I have read that drives should not be operated while more than 15 degrees from horizontal.

It appears to have been a last minute alteration to allow the Risc PC to be stood on its side, the only reason being that the case can only support up to 16Kg while Acorn supply a 17in

monitor weighing in at 21Kg.

A neat solution to the problem of CD-Roms rolling off the desk when the drawer is opened would have been to provide a thick slice to allow drives to be mounted horizontally while in a tower configuration.

Ian Burns, Billinge, Lancashire

Changing icon designs for the sake of it defeats the object of compatibility, the use of the acorn as the Task manager showed a change in operating system and functionality, but the files didn't alter therefore there was no reason to change their icons.

There's no problem running the disk drives on their side. It's been standard practice in many different types of machine for several years. In fact we've been running an old ST506 hard disk on its side for six years without any problems - even after dropping the whole machine off a desk (not recommended).

Producing a different thickness of slice would have been contrary to the design philosophy and, if you take a little time to think about it, would cause horrendous logistical problems.

Patience is a virtue



IN response to many of the comments in your letters pages over the last couple of months, I would just like to say the following about Acorn and the Risc PC.

Firstly, though the machine may be the best thing in the market at its price - considering the software as well - mine has one major drawback. I don't have it yet.

Though it has been on order since the Harrogate show I have not received a single piece of voluntary information from Acorn.

My dealer - Vertical Twist - have been most helpful, but having the customer relations department at Acorn telling me that I will have it within the next week for the last five weeks is a little annoying and, in my view, unprofessional.

Acorn should be commended for developing such a technically excellent machine but their lack of market research and predication of demand is once again staggering. I will admit that I was one of many

expecting to buy the machine at Harrogate. I even spoke to one man who had come up from Sherbourne in Dorset with cash for one.

Finally, I would like to comment on the letter from Mr Parker, *July Acorn Computing*. You cannot only say good things about a machine - it's unrealistic and untrue.

I suggest that it is a good idea to niggle Acorn on a regular basis, especially in public, as pointing out faults on all levels will keep them on their toes and ahead of the competition.

A.M. Ball, Cottingham, North Humberside

Ram dates updated



WE HAVE sent a technical reply sheet to Mr Ralph Jepson - *Pregnant sheep, May, Acorn Computing* - concerning adding days to dates in Fireworkz.

The answer is very simple and he could have saved a lot of time by contacting us first. We do operate a very strong technical support service and most enquiries are answered by return.

This service is open to all existing and prospective users and is completely free. There are no silly time constraints. Enquirers can call any time during normal office hours and there is usually someone here - programmer types - until much later.

We offer very comprehensive answers to enquirers and think that our support service is one of the best, if not the best, in the Acorn marketplace.

We can be contacted by phone on 0223 311881, fax 0223 312010 or e-mail info@colton.co.uk. We also have a user group ZLine who can be contacted on 0793 723347.

Jeremy Turner, Sales and Technical Support, Colton Software

Thank you to everyone who sent in solutions to Mr Jepson's something. But this does highlight a problem that we often deal with, where a reader asks us when it's simpler to ask the company involved. We don't mind helping - it's what we're here for - but if you do need assistance with software, please ask the manufacturer first.

Home wanted



I HAVE a number of Electron and BBC micro magazines together with disks which are of no further use to me. I would like to give these to a school or club who will be able to make use of them.

I have:

Electron User	May 1984 to July 1990
Let's Compute	August 1990 to July 1991
Micro User	June 1990 to February 1993

It seems a shame to just throw them away when they are full of useful information. I know I learnt a tremendous amount from all these magazines and I would hope that someone would find a home for them.

A.D. Bullock, Menorca, Spain

If you are interested in these magazines please write to Mr Bullock c/o Acorn Computing and we will pass your letters on to him.

Hiding their light



I AM writing to you in the hope that you will print the essence of this letter and that someone at Acorn will listen to what I – and I believe many others – are trying to say.

I have been happily using Acorn equipment both at school and at home for the past five years and I've found no cause to complain for any computing matter before this time, indeed I am delighted with my rather battered A3000.

My complaint has nothing to do with the quality of Acorn's products or their after-sales service. My complaint is aimed squarely at the marketing manager at Acorn headquarters.

Acorn have a superb range of equipment which can, in most instances, knock the pants off the competition. Acorn, however, appear disinterested in selling anything and on some occasions lack even the most basic faith in the selling power of their products.

I am no expert, but I do realise that people new to the computer scene would rather purchase a product they see advertised on television or in the national press than one whose reputation has been passed on by word of mouth. Acorn appear to rely only on this latter method of advertisement – I have only ever seen one advert for an Acorn machine in the national press.

When friends are buying computer equipment and I suggest Acorn they look at me as though I'm mad. "Acorn, never heard of them before." This angers me as the ease of use and power of Acorn computers are denied to so many new customers, new software development and retailers are denied to users and the prospect of even quicker growth for Acorn are dashed.

All because Acorn refuse to advertise. I realise that Acorn may be short of cash but a lack of advertising quickly worsens the situation.

With the launch of the superb

Speaking in tongues



I HAVE recently attempted a language translation program to enable me to type in an English word and have it translated into French and German. My problem arose when I copied it from the ram disk where I was saving my original program to a floppy disk for overnight storage.

The next day I loaded the program to a floppy disk but to my horror all the foreign characters had changed into Basic keywords. I changed this by going through the dictionary of words at the end and altering them all, but this took about an hour.

I still have hundreds of words to add and this may take some time to change in the future, so I wondered how I can revert the characters to their original state and keep it that way.

I am only 14 and used to program simple programs on the Electron before upgrading to an A3010 for my birthday, so I have some knowledge of Basic 1 programming but not much of Basic 5 which is used on the newer Acorn machines. Also, the accents and so on are a new thing. **Jonathan Stott, Dosthill, Staffordshire**

The problem is quite straightforward. Basic converts its keywords into codes made up of numbers in the range &80-&FF (128 to 255, actually, before anyone writes in, it uses 127 as well but that's not important here).

Unfortunately your foreign characters are also in the range &80 to &FF, and although you've put them into DATA statements you haven't surrounded them with quote marks, so Basic thinks they are keywords.

There's no simple solution here and typing them in is probably your best option. However, you'd be better off creating a data file of the words rather than putting them all in the Basic program.

You can read a line of ordinary ascii text from a file using the commands:

```
C%=OPENIN"data"
a$=GET$#C%
CLOSE#C%
```

GET\$# reads a whole line up to the next Return or line feed. The equivalent command for creating ascii text files would be BPUT#C%,a\$.

Risc PC I hope that Acorn's faith in its products will be restored and that it will pull its finger out to display to the general public the sheer power and ease of use of their whole range.

David Richardson, Otterbourne, Winchester

definitely comes first, then extra ram – if you haven't got it – then ARM3, then RISC OS 3.

As for hard disk size, it's a tricky one – 40Mb is not really enough. We think the minimum should be 80Mb, but as much as you can afford is the real answer – you can never have too much.

Hard news



I DESPERATELY need a hard disk for my A3000 for games like Birds of War and Simon the Sorcerer which I'm expecting to arrive soon. What size hard disk would you recommend or would you consider an ARM3 to be more important – I have a limited income.

Looking at the Watford Electronics advert it says that the interface comes with the hard disk. Do I need anything else to make it work?

David Kirkham, West Monkseaton, Tyne and Wear

Last question first: you don't need anything else to make the hard disk work. There would be no point in getting additional speed with an ARM3 if you were forever getting slowed down by floppy disk changes, so hard disk

Refined printing



WHILE I agree with your recommendation of colour inkjet printers to Mr Adler, I have invariably found that printed copies look far better when using only pure colours as Mr Adler suggests.

There is a very simple method of achieving this with any RISC OS application. Each of the three RGB colour bars in the palette selector must be set to either 0% or 100%. For applications with no palette selector window, simply set the colours in the Wimp's iconbar palette utility.

Steven Woolston, South Croydon, Surrey

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Includes 2Mb Ram, Colour Monitor, and LC Software	
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Includes 2Mb Ram and Colour Monitor	
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A4000 HD80 System	
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A5000 2M HD80 System	
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The Learning Curve System can be purchased with the A3010, A4000 or A5000 range of computers. It consists of an audio instruction tape and software including:- Acorn Advance and the PC emulator, £ 42

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The Risc PC 600 range - Modular, Upgradeable, Expandable with 24 bit colour screen modes

Risc PC 600

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Crawler	Cruncher	Deathstar	DieHard	Dratsab	Ebenezer
EMod	Ex_port	Extend	ExtendV2	FCodex	Funky
Garfield_I	Garfield_W	Handler	Icon	Image	Image2
Increment	IRQFix	Link	Machine	Marion	MemManager
MHelp	Mode87	Module	MonitorDat	MyMod	NetManager
NetStatus	NewDesk	Nitmare	Parasite	Penicillin	Poltergeist
Runopt	Shy	Sprite	SpriteUtils	System	System2
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-----Studio24-----

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Price £125.00 + vat Demo disc £5.00 + vat (Refundable)

Pineapple PAL Coder

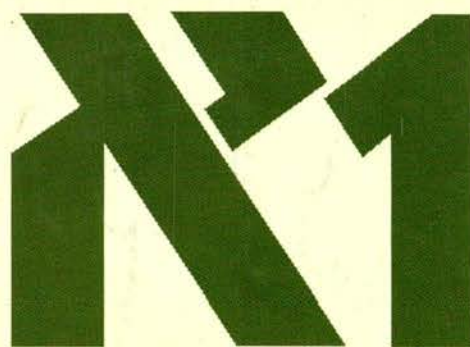
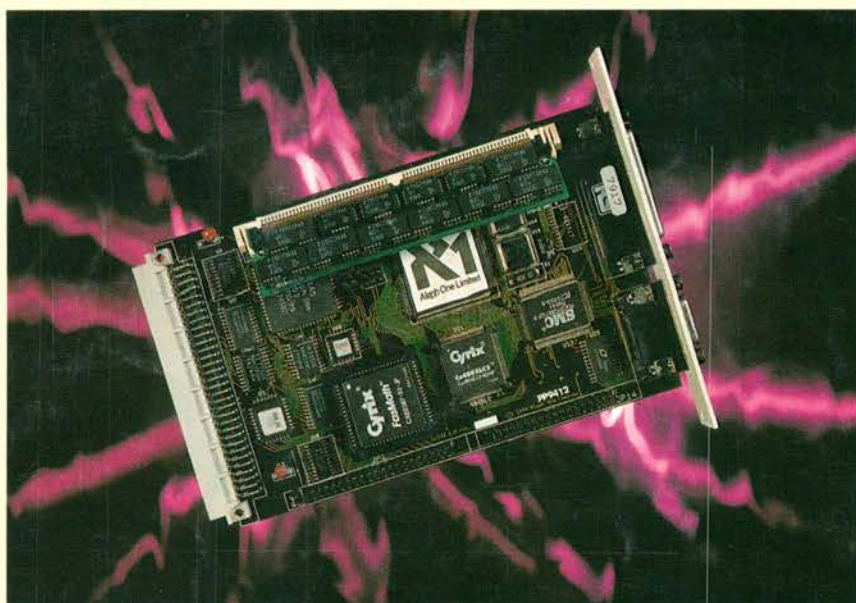
The Pineapple PAL Coder is a stand alone unit which provides a coded signal which can be recorded onto VHS or fed to any monitor or TV set with a coded input. The unit is inserted in the lead to the RGB monitor and provides an RGB output for the monitor together with a PAL coded output on a BNC socket. A second version also provides an output in S-VHS format as well as composite. Now available for Multiscan as well as standard monitors. Upgrade available for existing owners.

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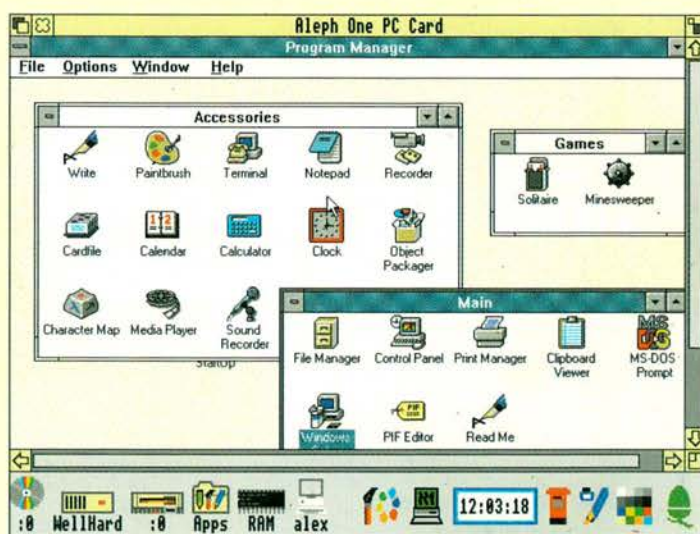
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